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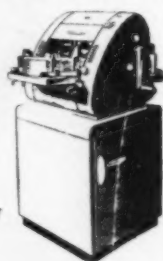
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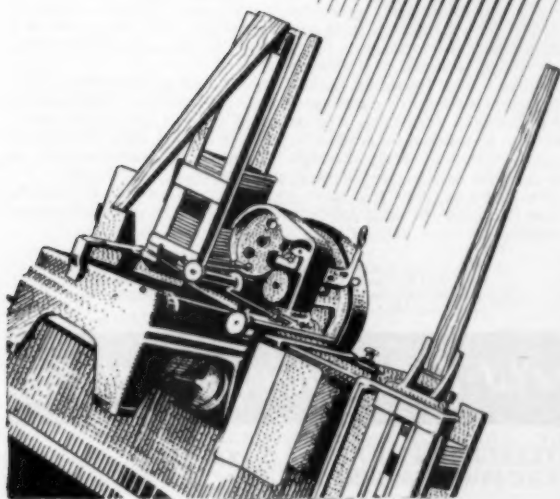
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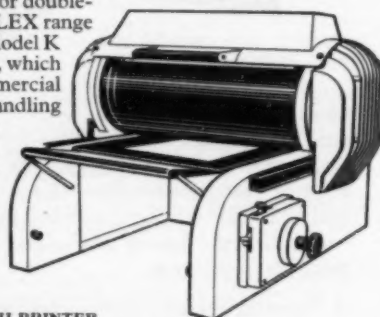
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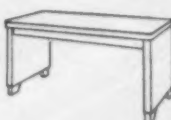
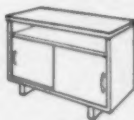
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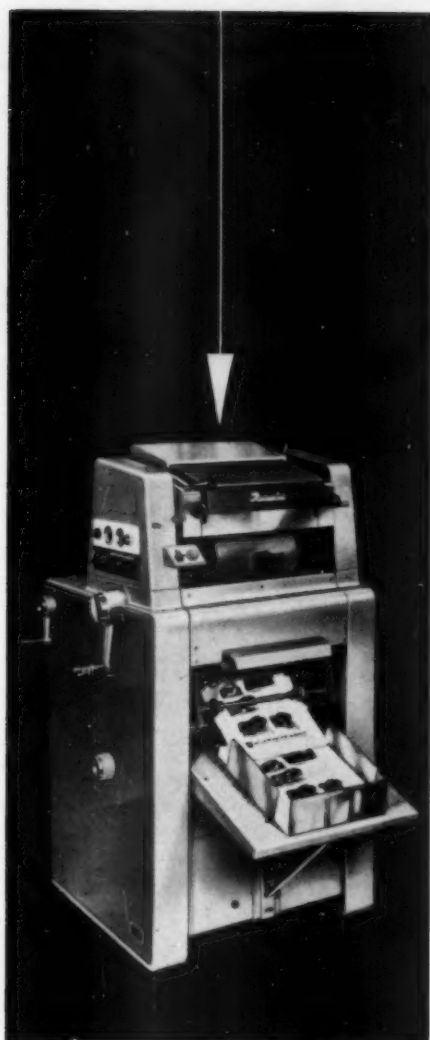
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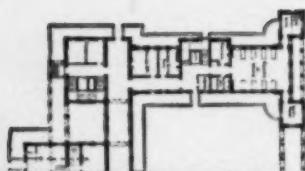
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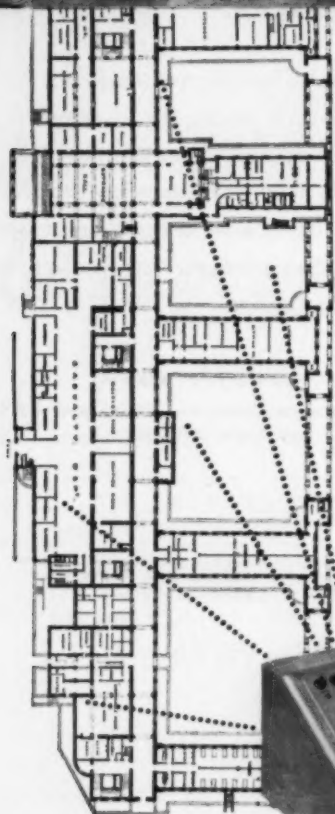
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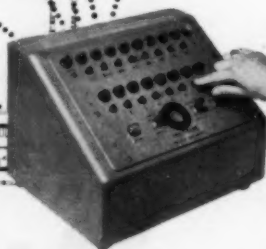
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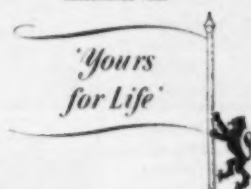
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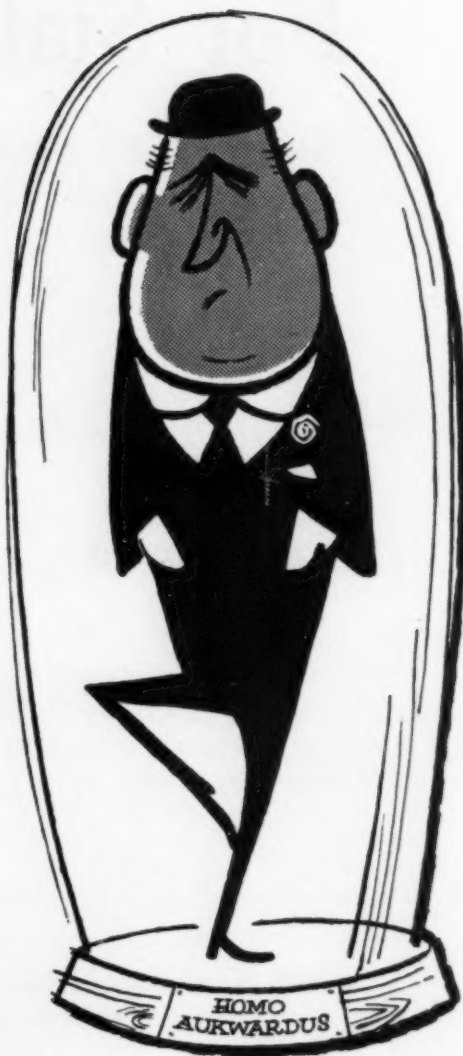
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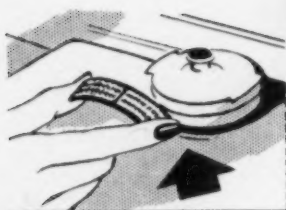
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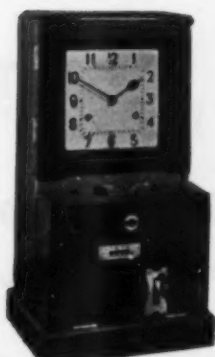
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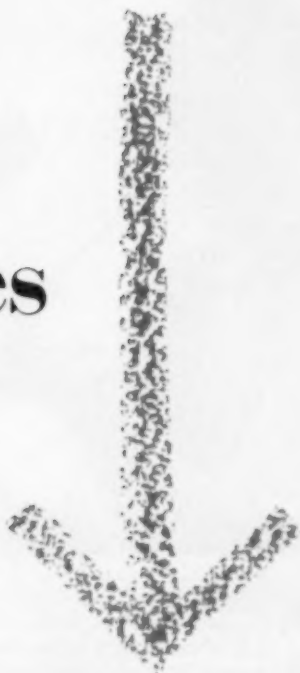
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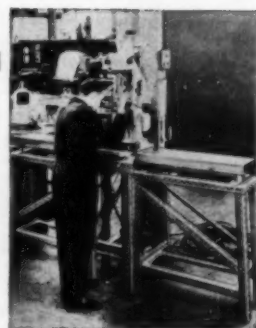
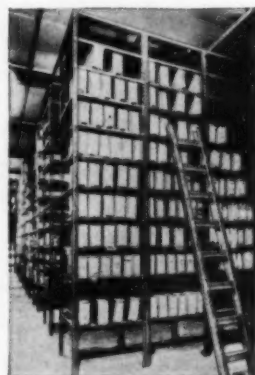
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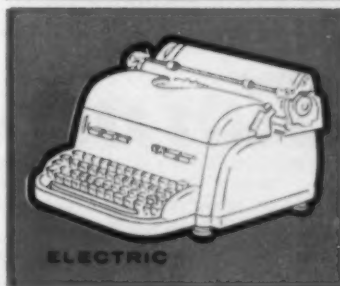
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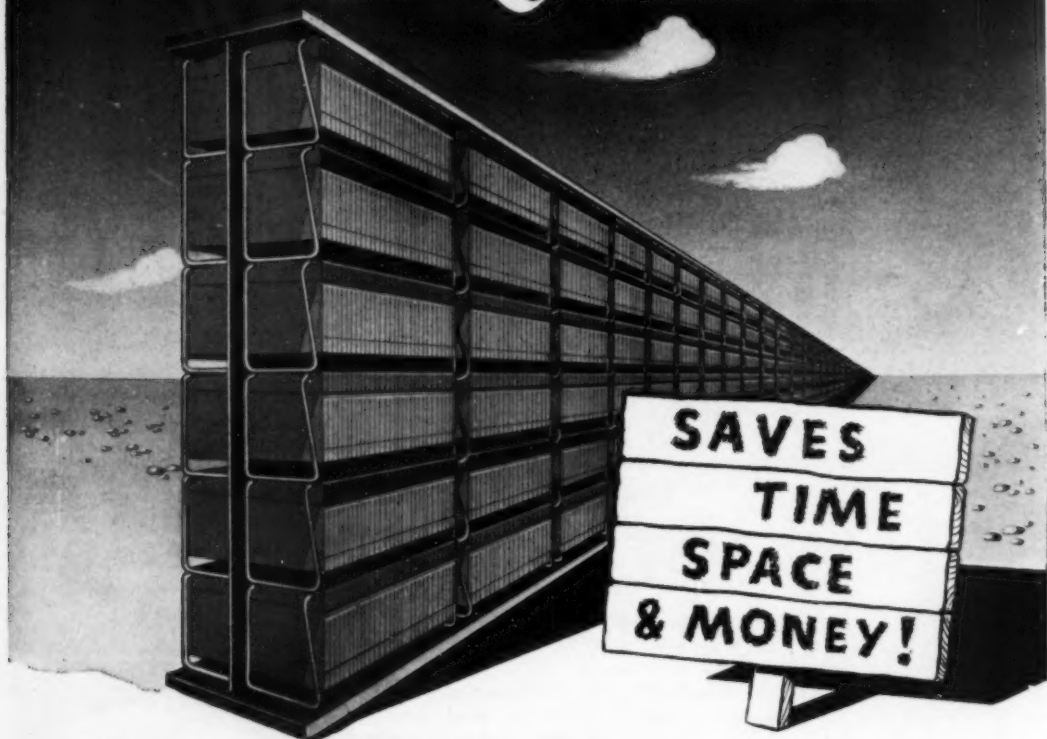
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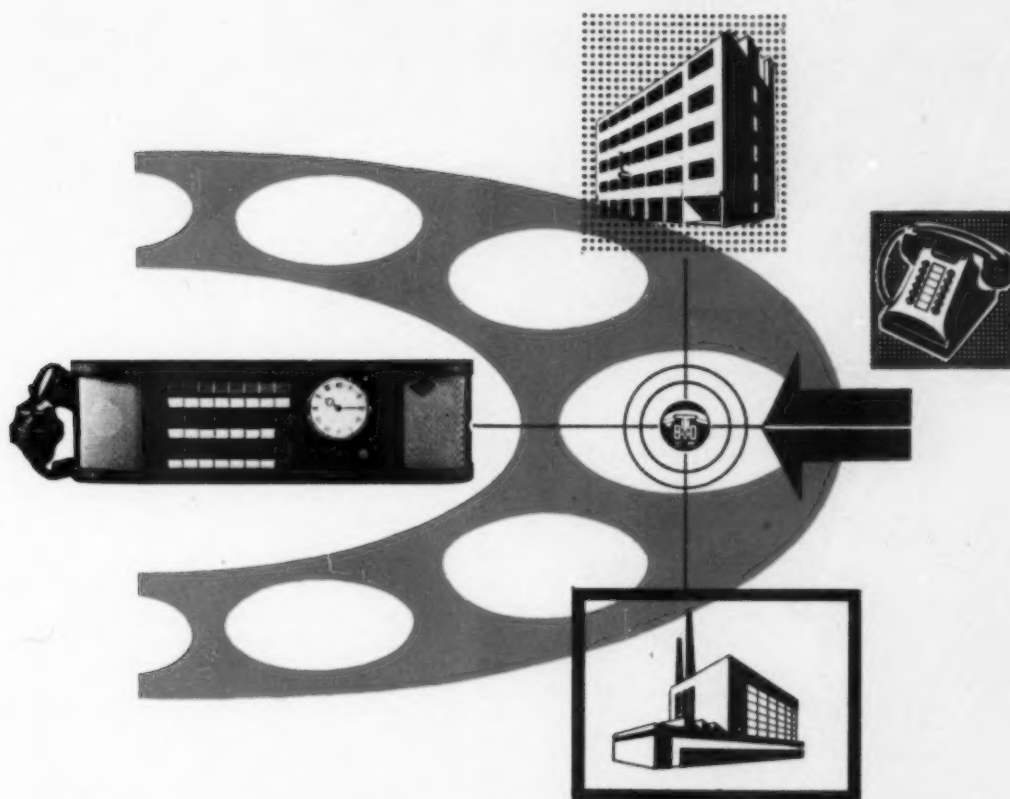
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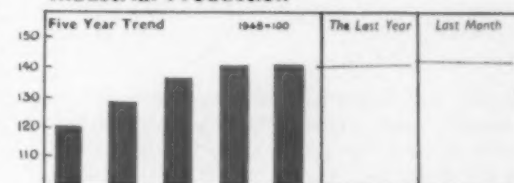
TGA FP 62
BUSINESS

STATE OF THE NATION

Employment rising • Production likely to follow • Overseas trade outlook promising • Total capital expenditure likely to continue at very high level, encouraged by stock exchange boomlet and cheaper credit • Consumer spending also buoyant • Prices and wages veering upwards.

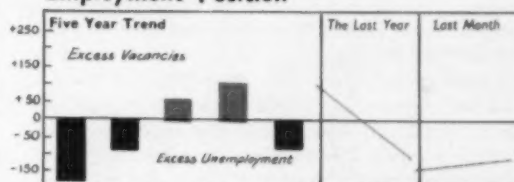
Industrial Production remains fairly stagnant, but is likely to rise substantially later in the year. Provisional March, 1957, figure of 142.3 shows an increase on 140 a year earlier. In the period January to March 1957, the average index was 141 (1948=100). This was the same as a year earlier but 20 points higher than four years earlier.

Industrial Production



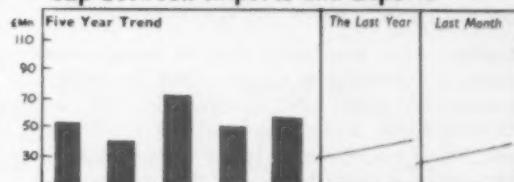
The number of unemployed is still in excess of the number of Job Vacancies, but the margin is decreasing. In April there were 285,000 vacancies and 342,000 unemployed. During the three months February to April the average number of unemployed was 104,000 more than the number of vacancies. A year earlier there were 114,000 more vacancies than unemployed but four years earlier there were 143,000 more unemployed than vacancies. Unemployment is likely to continue to fall.

Employment Position



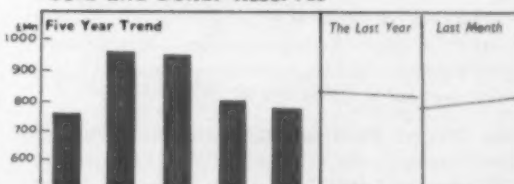
Trade Gap Between Imports and Exports Varies Around a Reasonable Average. In April the gap was £68.8 million, which compares with £48.4 million in March and £57.3 million a year earlier. During the period February to April average monthly gap was £49.6 million—a fall of £5.2 million on a year earlier and £16.9 million lower than four years earlier. (Chart shows position up to March.)

Gap between Imports and Exports



Gold and Dollar Reserves have risen again slightly, and may continue buoyant. In April the reserves stood at £829 million, which compares with £789 million a month earlier and £832 million a year earlier. During the period February to April, average level was £795 million, which was less than the £811 million a year earlier, but more than the £779 million four years earlier.

Gold and Dollar Reserves



THE CHARTS: Except where otherwise indicated, each bar chart depicts the average monthly value of a particular statistic during the most recent three months, and compares it with the same figure for each of the four preceding years. The earliest year in each case is shown on the extreme left. Under the heading "The Last Year," a straight-line graph depicts the latest month of a particular statistic and compares it with the same month a year earlier. And under the heading "Last Month," the most recent figure is compared with the one for the previous month. In both cases, the earlier figure is to the left and the later figure to the right.

MAIN ECONOMIC INFLUENCES on the STATE OF THE NATION

1. Trends in CAPITAL SPENDING

Industrial Investment Plans now suggest that there is unlikely to be any fall in capital spending. Bars in the accompanying chart show average quarterly expenditure for years 1952 to 1956. The 1956 average is estimated to have been about 17 per cent above 1955 and about 75 per cent above 1952. The Board of Trade Survey shows that in the last quarter of 1956 capital expenditure by manufacturing industry was 17 per cent higher than a year earlier.

Factory Building Approvals have declined considerably. During the first quarter of 1957, total area approved was 13.7 million sq. ft., which compares with 15.3 million the previous quarter and 21.7 million a year earlier, but only 8.1 million four years earlier. The decline in expenditure plans for new factory buildings is, however, matched by plans for increases in other forms of capital expenditure.

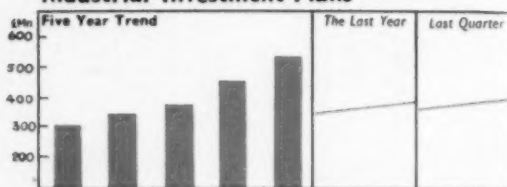
Machine Tool Orders have fallen from their peak, but outstanding orders are still high. In January, volume of orders on hand was £96.2 million—equivalent to 11 months' deliveries. Orders in February were £6.7 million, which is below the £7.5 million in January and the £9.7 million a year earlier.

Industrial Hire Purchase has recently been fairly buoyant. The Board of Trade index for H.P. financing of industrial plant and equipment was 100 in March, a fall of 1 point on February and 16 points above a year earlier. The accompanying chart is based on figures collected by Hire Purchase Information. Between March and April monthly H.P. Contracts for new cars and commercial vehicles rose from 16,700 to 17,700. Average monthly number of contracts in period February to April was 15,900, a rise on 14,400 a year earlier.

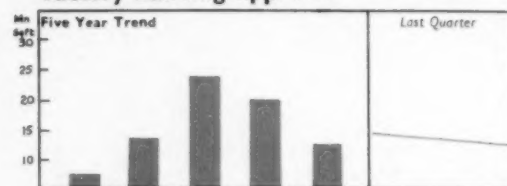
Material Stocks have lately risen in manufacturing industry but decreased in commerce and Government. Manufacturing stocks index for December, 1956, was 124 (1954=100), which compares with 113 a year earlier. Non-manufacturing stocks index (December 1954=100) was 95 in September, 1956, a fall of 12 points on the previous December. And by December, 1956, the index had fallen another 4 points according to provisional estimates. Bars in the chart show changes in value of stocks during the years 1952 to 1956. Graph lines show changes in the index of manufacturing stocks compiled by the Board of Trade.

Home Building Starts have fallen further. Permanent houses started in the fourth quarter of 1956 totalled 66,391 compared with 72,637 a year earlier and 74,000 four years earlier. Number under construction at December 31, 1956, was 271,531 which compares with 293,791 a year earlier.

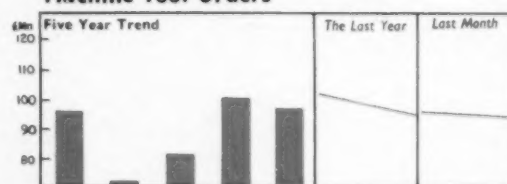
Industrial Investment Plans



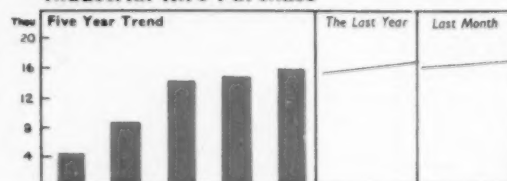
Factory Building Approvals



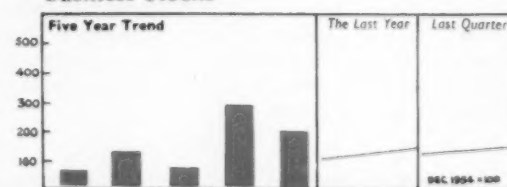
Machine Tool Orders



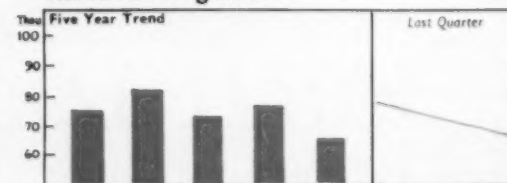
Industrial Hire Purchase



Business Stocks



Home Building Starts



2. Trends in CONSUMER SPENDING

Retail Sales outlook is improving. In March the index was 144 which compares with 138 for February and 141 a year earlier. During period January to March, 1957 the average index of retail sales was 142 which compares with 134 a year earlier and 115 four years earlier. Consumer spending is likely to continue upwards.

Domestic Hire Purchase business has recently been fairly steady. The Board of Trade index for H.P. sales of household goods was 69 in March, a fall on the January figure of 70 but above the figure of 63 a year earlier. The accompanying chart shows the trend of H.P. Sales of used cars. Between March and April the number of contracts rose from 45,600 to 50,300. Average monthly number of contracts during the period February to April was 43,900, a rise on 26,800 a year earlier and much greater than the 12,400 four years ago.

Weekly Wage Rates have recently risen and are likely to rise further by a few points. The February index was 107, or 1 point above January and 6 points higher than a year earlier. In the period December, 1956 to February 1957 the average index of weekly wage rates was 106, which compares with 100 a year earlier and 86 four years earlier.

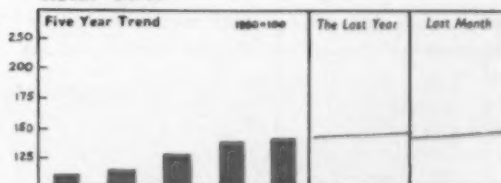
Personal Expenditure is rising, but is not quite keeping pace with price increases. In the fourth quarter of 1956 it was £3,606 million, which compares with £3,467 million a year earlier. There was thus an increase in spending of 4 per cent in the latest year, at the same time that prices have risen 4½ per cent.

3. Trends in PUBLIC SPENDING

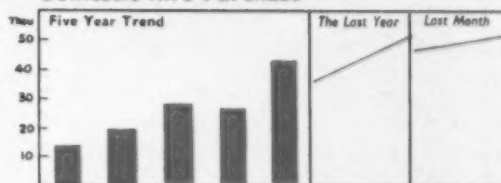
Payments from the Exchequer in the last financial year were £340 million ahead of the estimates, but are expected to be about £40 million lower this year—though so far they are slightly up. Between 1952 and 1956, Government expenditure increased by 17½ per cent and prices rose by 12 per cent, so that expenditure in real terms rose by 5 per cent.

Budget Surplus expected in the current financial year is £462 million, which compares with an actual surplus of £290 million in the last financial year. The accompanying bar chart shows the budget surpluses in the calendar years 1952 to 1956. These are the above-the-line surpluses. The graph line compares the current financial year to date with the same period a year earlier.

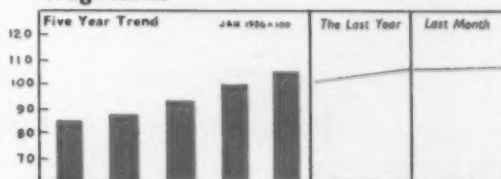
Retail Sales



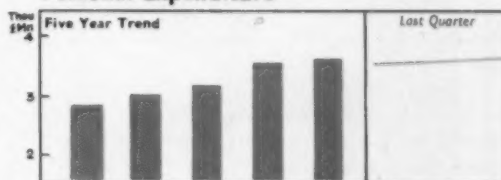
Domestic Hire Purchase



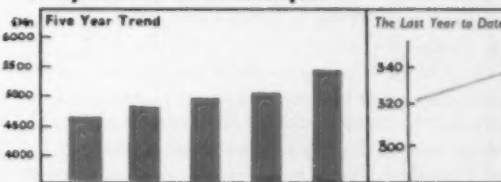
Wage Rates



Personal Expenditure



Payments from Exchequer



Budget Surplus or Deficit

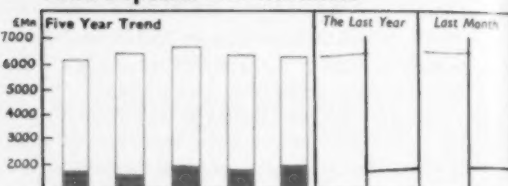


4. Trends in CREDIT POLICY

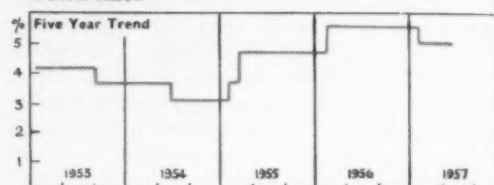
Bank deposits and advances have both recently been fairly steady. During period February to April, average level of bank deposits was £6,200 million. This compares with a level of £6,100 million a year earlier and £6,000 million four years earlier. Bank advances during the period February to March were at an average level of £2,000 million or higher than the figure of £1,900 million a year earlier and higher than the level of £1,800 million four years ago.

Bank Rate at the time of going to press, is likely to be cut slightly. The accompanying chart shows the movement of Bank Rate for the last five years. In March, 1952, the rate was raised from the long-standing 2½ per cent to 4 per cent. It later went down to 3 per cent and then up to 5½ per cent, but on February 7 this year it was reduced to 5 per cent.

Bank Deposits and Advances



Bank Rate



5. Trends in MARKET PRICES

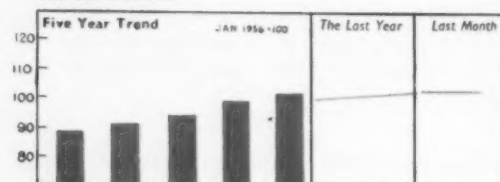
Retail Prices are likely to remain steady, tending upwards. The new series index for March was 104, the same as for February and 3 points higher than a year earlier. Average figure for period December, 1956 to February, 1957 was 104, compared with 100 a year earlier and 90 four years earlier.

Raw Material Prices have risen slightly. In April, 1957, the price index of basic materials used in non-food manufacturing industry was 160.0, a rise of 0.9 points on March and an increase of 5.1 on a year earlier. Average level of the index during the months January to March was 159.7. This compares with 155.0 a year earlier and 151.1 four years earlier.

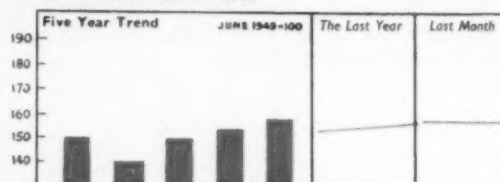
Import prices have recently fallen and Export prices remained steady. In March the import price index fell 1 point to 110 and the export price index remained at 110. During the period January to March, 1957, average level of the import price index was 110, or 5 points higher than a year earlier and 6 points higher than four years ago. In the three months January to March, 1957, average level of the export price index was 110. This was 5 points higher than a year earlier and 8 points higher than four years ago.

Share Prices have risen and may go higher. During period February to April the average level of the *Financial Times* index of industrial ordinary share prices was 190.2. This represented a rise on the level of 181.2 a year earlier and a larger rise on 122.6 four years earlier. In May, at the time of going to press, the index was several points above the April average of 197.7

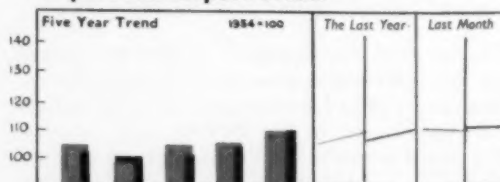
Retail Prices



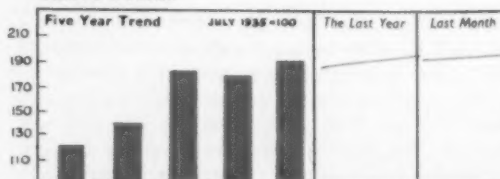
Raw Material Prices



Import and Export Prices



Share Prices





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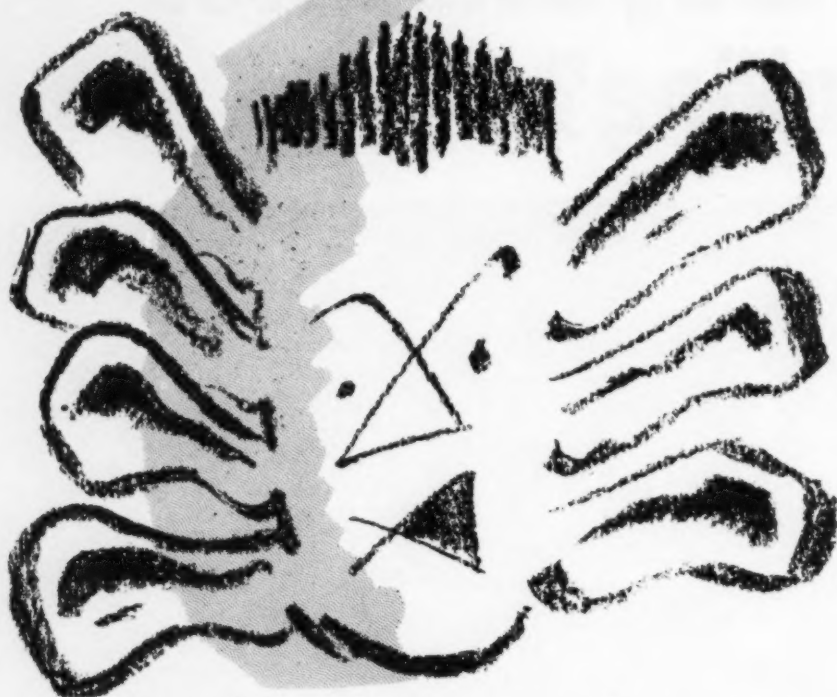
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HOME MARKET SURVEY

A Round Britain Survey: Regional Notes on Markets and Industrial Developments

NORTH WESTERN

MORE vacancies still exist for skilled machinists in the **engineering** industry, despite the credit squeeze and fuel rationing, than there are men to fill them. Firms in the area are, however, concerned about the maintenance of production levels and there is growing awareness of the threat of overseas competition as costs rise.

Machine tool makers have a good volume of orders in hand although some concerns report a falling off in export business. Considerable demand is being experienced by manufacturers of **heavy electrical** equipment, **transformers**, **switchgear** and **diesel electric locomotives**, while **boiler** makers and producers of **crankshafts** are busy. Although **steel** makers in Lancashire and Cheshire are maintaining record outputs, there is still a shortage of special alloy steels and semi-finished steel.

For the first quarter of this year 94 **industrial building** schemes with a total area of 14 million sq. ft. were approved, and the industry can look forward to some months of full activity, particularly in the public sector. Private building plans are, however, being considerably affected by the credit situation. Indicative of the economic growth of the region is the fact that over the past year the working population of Lancashire and Merseyside has risen by some 25,000.

Due to be in operation during next year is the new £1.75 million petrochemicals plant for the production of styrene monomer at Partington, on the Manchester Ship Canal. A large part of the output will be taken by Styrene Products, a wholly-owned subsidiary, for the manufacture of polystyrene moulding powders which are widely used in the production of **plastics** goods. Manchester Oil Refinery (Holdings), whose crude oil supplies are drawn from the Western Hemisphere, have been reorganizing and strengthening their research department and are to erect additional storage tanks to increase throughput in 1958. On the chemical side, the new sulphonate plant is in operation, and certain ancillary plants are being constructed and further storage facilities provided.

A £300,000 contract for the supply of **glass insulators** for the Kariba Dam project, is currently being fulfilled by Pilkington Bros., St. Helens. Present output of the plant is about 1 million insulators annually and this is to be stepped up to 30,000 a day. A new £200,000 high voltage testing laboratory is now in operation. Another Kariba Dam contract, for the supply of £200,000 worth of **cables**, has been awarded to British

Insulated Callender's Cables, who have works in Lancashire at Prescott, Leigh and Melling and in Cheshire at Helsby. Continuing their expansion in the **electronics** field, Automatic Telephone and Electric Co. have purchased a modern five-storey building in the centre of Liverpool with a floor area of 55,000sq.ft. on a 3,000sq.yd. site. A large volume of work for export is currently being undertaken at the Trafford Park works of Metropolitan-Vickers Electrical Co., including geared **steam turbine-generator** sets with an aggregate capacity of over 30,000kW for Eire, the Middle East, Africa and India. A £100,000 order for air-blast circuit breakers has been received from the Electricity Commission of New South Wales together with a contract for the 20MW turbo-alternator generators for Canada's first atomic power station. M-V are to produce industrial **control gear** at a new factory at Huyton on a site covering over 18,000sq.ft. Some 750 people will be employed.

Cammell Laird and Co., Birkenhead, who are building one of two 65,000 ton deadweight **tankers** for Shell—the largest so far ordered in Britain—are carrying out investigations in their engineering development section on the design of atomic-powered vessels. The prototype nuclear power unit for the British atomic submarine, whose construction has already been announced, is to be built in a land-based hull at the Barrow



The vertical line at 100 represents the national average level of retail trade for the latest month (March). Against this average the performance of each region may be measured

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ECONOMIC PROSPECT

yard of Vickers-Armstrongs by Vickers Nuclear Engineering.

To deal with the rising flow of components required for their **truck and bus** production line, Leyland Motors have installed a new mechanized shot-blasting department. In the foundry the green sand moulding plant has been re-equipped at a cost of £30,000. Now in operation at the Oldham plant of Seddon Diesel Vehicles Ltd. is a new service department covering an area of some 12,000sq.ft. together with a spray painting bay capable of housing 12 vehicles at a time.

A £2 million factory, now in process of erection on a 32-acre site at Farington, near Leyland, is scheduled to become the headquarters of the British Tyre and Rubber Co.'s manufacturing operations in Lancashire. Providing expanded production facilities for a number of the firm's specialized industrial **rubber** products, it will be starting up early next year. Development and test laboratories will be provided together with experimental and engineering shops and general offices. British Tyre have discontinued the manufacture of car, giant and cycle **tyres** at their Leyland plant and this is now being equipped—as a temporary measure—for the production of **thermoplastic** and **rubber** products in the industrial field. These new lines will later be transferred to the Farington works together with other special items including roller coverings, cutless rubber bearings and tank and pipe linings.

British United Traction Ltd., Leyland, are now carrying out British Railways' contracts worth nearly £1.5 million involving the supply of 572 **diesel engines** and **transmissions** and 405 sets of driver's controls. To meet home and overseas demand, the company are carrying out a programme of development of railcar power units for heavier duty and also for lightweight two-axle railbuses. Mitchell Shackleton and Co., the **crankshaft** makers and forgemasters of Patricroft, Manchester, have embarked on a large scheme of modernization and extension including the conversion of the forge furnaces at the firm's subsidiary works to fuel oil burning.

An eight-year, £5 million reorganization scheme is under way at the Warrington factory of Joseph Crosfield and Sons. Production of the firm's **soaps**, **industrial detergents** and **silicates** is to be centred on the Lancashire side of the Mersey. Lancashire Steel Corporation, who now have in production the first of two new large capacity blast furnaces and the first of two new 250-ton steel furnaces, are making good progress in the building of the 21 new coke ovens, the provision of new sidings and other development work designed to increase the capacity of the plant.

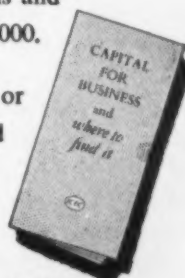
The new 750,000sq.ft factory of the H. J. Heinz Co. at Kitt Green, near Wigan, that is costing £7 million to build and equip will be opened in mid-1958. A four-



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ECONOMIC PROSPECT

year extension and rebuilding scheme is being carried out at the Manchester works of Phillips Rubber Soles with a view to increasing production and helping to reduce costs. Meanwhile additional premises and equipment have been secured by the company at Blackburn and also at Bury.

A. Boake, Roberts and Co. (Holdings) Ltd. are developing their business in three main product ranges—industrial chemicals, aromatic and fine chemicals, and flavouring and perfumery compounds. Chemical production is to be concentrated at the new, large-output plant now being erected on an 83-acre site at Widnes. It is scheduled for completion by the end of this year. Operations now carried out at the firm's Rainham factory will later be transferred to Widnes, and the main works of Stratford are to be re-developed for the manufacture of aromatic and fine chemicals on a large scale, and for the expansion of the research and development departments. Extensions at the Speke, Liverpool, factory of Evans Medical Supplies Ltd., include a modern tablet manufacturing department with a floor space of over 30,000sq.ft.

A number of development projects are currently being carried out by Associated Electrical Industries Ltd. A new factory at Huyton has been secured to enable capacity for control gear to be expanded, and on a site at Wythenshawe is to be erected a "hot" laboratory for investigations into the properties of radioactive materials—the only industrial unit of its kind in the country. Additional papermaking machines and equipment are now being installed in the Lower Darwen Mill of the Wallpaper Manufacturers Ltd., Manchester, who have already extended and re-equipped their two larger units, Hollins Mill and Darwen Mill.

Biggest news in the textile field has been the merger between Courtaulds and British Celanese, the U.K.'s two major rayon and artificial fibre producers. The move will strengthen the new group's position both at home and on the Continent in face of the European Common Market. Another new company, formed by Tootal in association with West Point Manufacturing Co., are to begin production of non-woven fabrics in a new factory that is now being equipped at Bolton. It is expected to open this autumn.

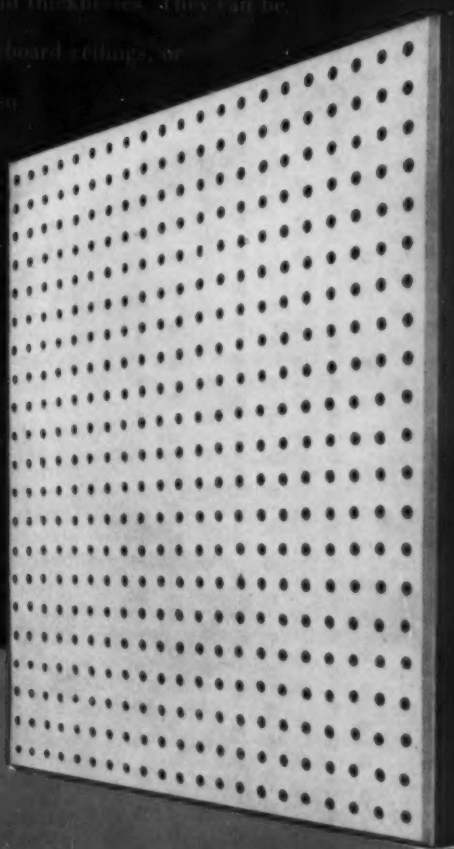
Six commercial firms have formed a co-operative group to exploit the possibilities of a new textile processing technique developed by the British Rayon Research Association at Wythenshawe. The new technique uses a fluid bed which is an efficient means for conveying heat and is therefore of great potential value in any textile process involving heat transfer. A policy of co-operation in all branches of research where possible is to be pursued by the British Cotton Industry Research Association and the British Rayon Research Association.

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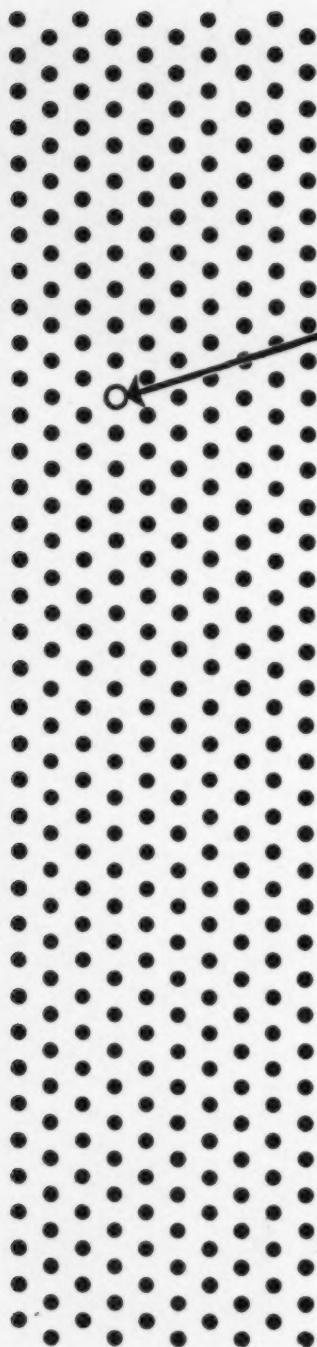
It deals with many aspects of noise and sound control, and illustrates some of the ways in which John Dale Engineers have dealt with them.

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EXPORT MARKET SURVEY

A Round-the-World Survey: Country by Country

ISRAEL

POPULATION is in every sense the most pressing problem in Israel today. Since the establishment of the new State just over nine years ago its numbers have risen from an initial 750,000 to something over 1,800,000, and immigration this year from all parts of the world is expected to add a further 100,000. Israel is understandably reluctant to put a check on the influx of new citizens—and indeed many of them, particularly those from Eastern Europe and Egypt, bring valuable skills with them—but at the outset they constitute a considerable burden on an already fully-stretched economy.

The cost of absorbing a family of four, for instance, including travelling expenses, initial funds and housing, is around £1,300, and to that must be added the capital investment needed to provide them with a livelihood. One of the plans being adopted is the placing of 4,000 new immigrant families in collective settlements and co-operative villages. The £500,000 Anglo-Israel Development Corporation, sponsored by the Zionist Federation of Great Britain, is aiming to establish 100 families from U.K. and Eire in the new industrial township of Kiryat Gath in the Lahish area, an important cotton and groundnut centre where factories and workshops are being erected.



Each of the past nine years has had its crises and triumphs, stemming from the effort of building a modern industrial nation literally out of desert rock and sand. The task has already cost around £900 million, and side by side has gone the work of strengthening defence. During the first nine months of 1956 security expenditure accounted for £1,250 million out of a total budget expenditure of £1,780 million. The battle, too, has also been fought against inflation, though not wholly successfully. Last year, wages rose by some 14 per cent without any corresponding increase in productivity, but at the same time industrial output in the aggregate went up by around 8 per cent and agricultural production by 16 per cent. Imports of capital goods, fuel and lubricating oils registered a large jump in 1956, and, despite record exports, the country's trade gap widened to £93 million over the period. Israel's position is complicated by the fact that exports, at the best, only

cover about one quarter of imports, and the balance has been made good by U.S. grant-in-aid payments, German reparations and overseas remittances. Additional receipts from this last source helped to cover half the deficit caused at the time of the Suez crisis by the withdrawal of all American aid lines.

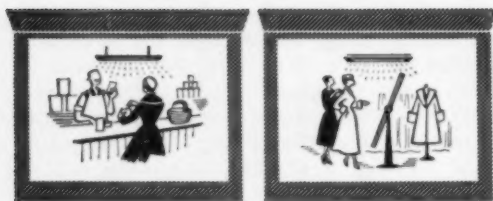


Swiftest possible development of the economy is the primary objective of the Government who rightly see in the establishment of new industrial and agricultural enterprises the best hope for the speedy absorption of the bulk of new immigrants. To advise on projects a U.N.-sponsored technological advisory committee has been formed. Headed by Sir Ben Lockspeiser, president of Euratom, it comprises six foreign and 10 Israeli experts who will meet three or four times a year.

The initiation of private projects is encouraged. With a capital of \$10 million a group of U.S. businessmen have formed a new investment company to operate in industry, hotel construction, oil prospecting and citrus growing. Ampal, the American investment concern already active in the country, are planning to increase their stake in the Israeli oil industry, in banking and in shipping this year by several million dollars. Oil is the biggest news on the industrial front and bids fair to transform the country's economic outlook. Oil was first struck at Heletz in the northern Negev where already 15 wells have been established and nine are in production, yielding an average of 100-120 barrels a day each. In March, oil was struck at two more wells in the Heletz field, and this year 40 new oil drillings are to be made. The field is jointly drilled by Israeli Oil Prospectors and Lapidot Oil Co., and the latest concern to begin operations in the country is Judea Israel Petroleum Co. who hold a 60,000-acre concession to the west of Jerusalem and started sinking their first borehole in April. The Israeli company, Naptha, are drilling on the shores of the Dead Sea, and Israel Continental Oil Corporation are operating south of Tiberias on the shores of the Sea of Galilee. By the end of this year, it is estimated, the Heletz field should be yielding at the rate of 200,000 tons of crude oil a year—about 15 per cent of Israeli requirements.

One effect of the Sinai campaign has been to speed up

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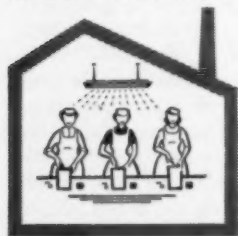


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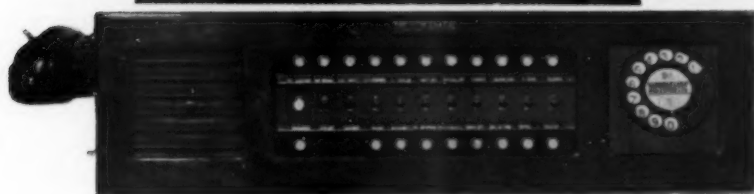
communications and other projects in the Negev. One major scheme, completed in record time, has been the laying of an 8in. oil pipeline from Eilat on the Gulf of Aqaba to Beersheba—an enterprise that opens up promising vistas since it gives Israel a new link between the Mediterranean and the Middle East. With an annual capacity of 700,000 tons of crude oil, the pipeline came into use in April, the oil being carried by road and rail tankers to Haifa for refining. At that plant, incidentally, Consolidated Refineries have installed modern equipment that will increase by 20 per cent the supply of gases to the nearby works of Fertilizers and Chemicals and enable that concern to expand output of nitrogenous fertilizers. Side by side with the 8in. pipeline a 16in. pipeline is now being constructed to the Mediterranean coast, and a further line is projected between Beersheba and Wadi Shukreier.

The Haifa-Beersheba railway is to be extended to Eilat where a modern deep-water harbour capable of taking ships up to 20,000 tons is to be constructed. It will take three years to complete. At Ashdod Yam, between Ashkelon and Tel Aviv, a freight terminal for shipping—and eventually a deep-water port—is projected, and another harbour is to be sited at Acre capable of handling vessels of up to 3,000 tons and serving as an outlet for the growing Acre and Nahariya industrial areas. Over the next few years the Israeli merchant fleet is to be more than trebled in size. Contracts for ships delivered and on order within the framework of the Israeli-West German reparations agreement total over £18 million and orders for 27 new ships are worth some £23 million. When the 600,000 deadweight ton programme is completed about 50 per cent of the country's total trade could be carried in Israeli-flag vessels. Latest ship in the Zim fleet, a 10,000 ton liner, left London on May 7th on her maiden voyage to Haifa.

Symptomatic of a major policy switch is the new emphasis on the building up of basic production from local sources as distinct from the establishment of consumer goods' and finishing industries. Only a few months ago the first furnace was commissioned at the steel plant near Acre, and new smelting works are now in course of erection there: the two 40-ton furnaces are British made. The plant, which will utilize local iron deposits, will have an initial output of 50,000 tons a year. American Israel Paper Mills are to construct at Hadera a mill for the production of 15,000 tons of pulp a year using locally grown fibres, and also a new paper manufacturing unit which will increase output by 10,000 tons annually. Near Petah Tikva a new carbide factory utilizing local lime deposits is to be set up by Israeli, U.K. and Swiss investors with a yearly production of 4,000 tons.



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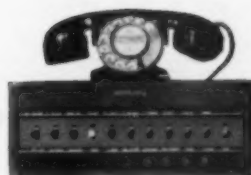
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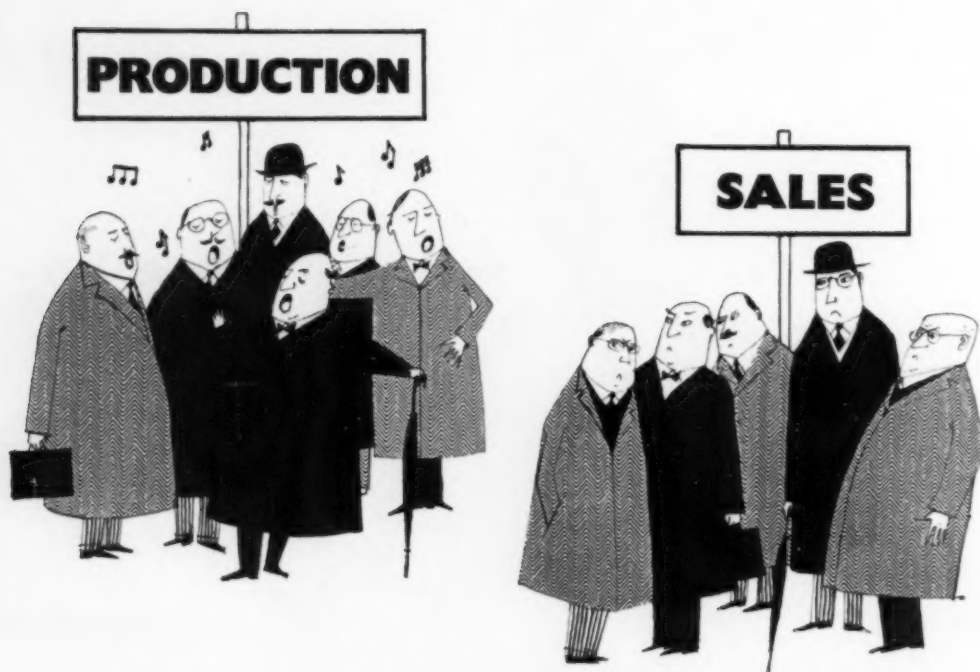
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MARCH OF BUSINESS

IDEAS AND ACTIONS OF FORWARD-LOOKING EXECUTIVES

PRICE FREEZE DANGERS

THE idea of an industry agreeing to 'freeze' prices for a definite period (as in the cement industry) was criticized by Halford Reddish, outspoken chairman of the Rugby Portland Cement Co., in his speech at the company's A.G.M. He declared that if this course were followed to any extent by British industries it would "lead to disaster."

The result of artificially holding down prices while incomes continued to rise would be an added "impetus to inflation, and an increased home demand to the detriment of exports."

"The Government", said Mr. Reddish "are quite properly endeavouring . . . to reduce the subsidies and distortions which have crept into our economy since the war. What is the use for them to pursue that course if industry is creating further subsidies of its own?"

"I say quite bluntly that it is an industry's duty, not only to its employees, but to the nation as a whole, to make profits and not to apologise for them . . .

"I am entirely opposed to any attempt to put our economy into a straightjacket—to any limitation on either wages or profits other than that imposed by the natural economic law of supply and demand."



Progress is now being made with an OEEC research study of internal business organization. Initiated by the European Productivity Agency, it will give the eight participating countries—including the U.K. and four 'common market' countries—comparative information on the subdivision of management responsibilities and executive development in medium sized firms.

The British research—in the hands

of Urwick, Orr and Partners Ltd.,—will break new ground in this country, by collecting information on the problems of medium-sized businesses similar to that which the Acton Society Trust collected recently for the largest British firms.



NEGLECTED COURT

THE commercial court of the High Court offers businessmen special facilities for the settlement of disputes, including a simplified procedure, simplified pleading and (with consent) the reception of normally inadmissible evidence and the decision of issues on documentary evidence alone. Since the court can investigate and decide both law and fact it can very often provide a quicker and cheaper solution than arbitration.

Consequently it is surprising to find judges in two recent important commercial cases strongly criticizing the neglect by the business community of this facility—a criticism fully borne out by the facts.

In the first case the dispute arose early in 1951. The arbitration machinery took well over two years. Nevertheless, the matter eventually went to the commercial court in May 1955 and was finally decided by the House of Lords, all in little more than 18 months.

Their Lordships said that the time taken since 1951 was not caused by the legal delay but by the parties' failure to use the commercial court facilities.

In the second case—which, said Mr. Justice Devlin, had taken him 1½ hours—the contract had been broken in October, 1953 and the matter

Next Month

THE WAY TO THE TOP

Next month's issue will contain a full report of the first of a series of lunch-discussions which is now being organized by BUSINESS.

At each of these a small, carefully-chosen panel will give considered views on a subject of interest and importance to all executives.

The first discussion deals with education for top management from a very practical standpoint: How can the individual prepare himself for high-level responsibilities? The panel, under the chairmanship of Lord Piercy, encompasses a wide range of knowledge and experience. Readers will find its opinions and advice both constructive and thought-provoking.

FRESH FIELDS. The July issue of BUSINESS will also contain an article describing the experience of firms which have set up factories in New Towns.

had initially gone to arbitration. The lay arbitrators could not agree and an umpire was appointed. "If businessmen prefer an expensive and lengthy procedure—in this case lasting something over three years—they are entitled to have it," said his Lordship.

He added: "The time may come when it will have to be considered whether there is any longer any value in the commercial court providing the City of London with special facilities."

★ ★ ★

One of the highlights of last month's Instruments, Electronics and Automation Exhibition was an "Electronics at Work and Play" feature. But exhibitors seemed to have difficulty in relating the two ideas. Although attention-getting gimmicks like robot tortoises and noughts-and-crosses machines were grouped in a sort of children's corner, their possible relevance to industrial applications was not exploited.

Certainly the exhibition as a whole was not completely successful in button-holing the businessman-in-the-street. A lot of money had been spent on the main stands, but in many cases the aisle-walker was left in doubt concerning (1) exactly what was being shown; (2) what the product could do; and (3) why it was of interest.

★ ★ ★

CHURCH AND INDUSTRY

THE Church is often criticized for its apparent reluctance to get to grips with everyday problems. (At the same time churchmen who do pronounce on secular matters—political or otherwise—are generally told that they should first put their own house in order!)

One of the most successful efforts to bring together Church and factory is taking place at Luton, Bedfordshire. Under the leadership of the Rev. William Gowland, a run-down Methodist Church in the centre of the town has been transformed into a lively industrial mission.

Mr. Gowland was one of the first

Christian Commandos. Later he created 'industrial parishes' in Reading and Manchester. His Luton work—now being watched with keen interest by churchpeople all over Britain—is a full-scale development of these early experiments.

The opening phase was described in the September 1955 issue of *BUSINESS* (page 129). Since then, much progress has been made. Now in full operation is the mission's community centre, with cinema-style reception rooms opening on to the street outside the church building.

A new development is the opening of a College of Industrial Evangelism. Its aims are to "make the Christian faith real to the world in which we live; to meet that need in industry which is beyond even the finest welfare work; and to train people (primarily laymen) in the theory and practice of industrial evangelism."

It is not "for Christians only". Its sponsors say: "Anyone willing to consider the claims of Christ is welcome."

Among those who attended the dedication ceremony last month were representatives of the nine factories in which Mr. Gowland now serves as chaplain, the secretary of the Luton Trades Council, and a number of trade union representatives.

★ ★ ★

Kingston Productivity Association has launched a scheme under which technical college teachers will be able to do regular periods of practical work in local firms. The benefits which American industry gains from the extensive interchange of teachers and industrial specialists were emphasized in reports by Anglo-American Productivity Council teams, but the practice has still to be accepted widely in Britain.

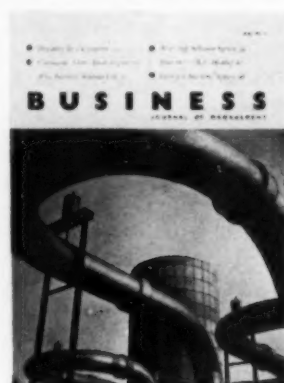
★ ★ ★

NEW LOOK

THROUGH the eye of a camera, industrial scenes often assume pictorial qualities which are generally overlooked by those who have to work in them. An example is this

month's cover picture, taken specially for *BUSINESS* by the Bristol Aeroplane Co.'s staff photographer, G. V. S. Davey, F.R.P.S., A.I.B.P.

It shows the silencing tower which forms part of a new extension to Bristol's test plant for *Thor* and other ramjet engines. In the new plant, high-altitude conditions will be simulated by enclosing the test engine in



a steel drum in which reduced pressure is maintained by a battery of steam ejectors.

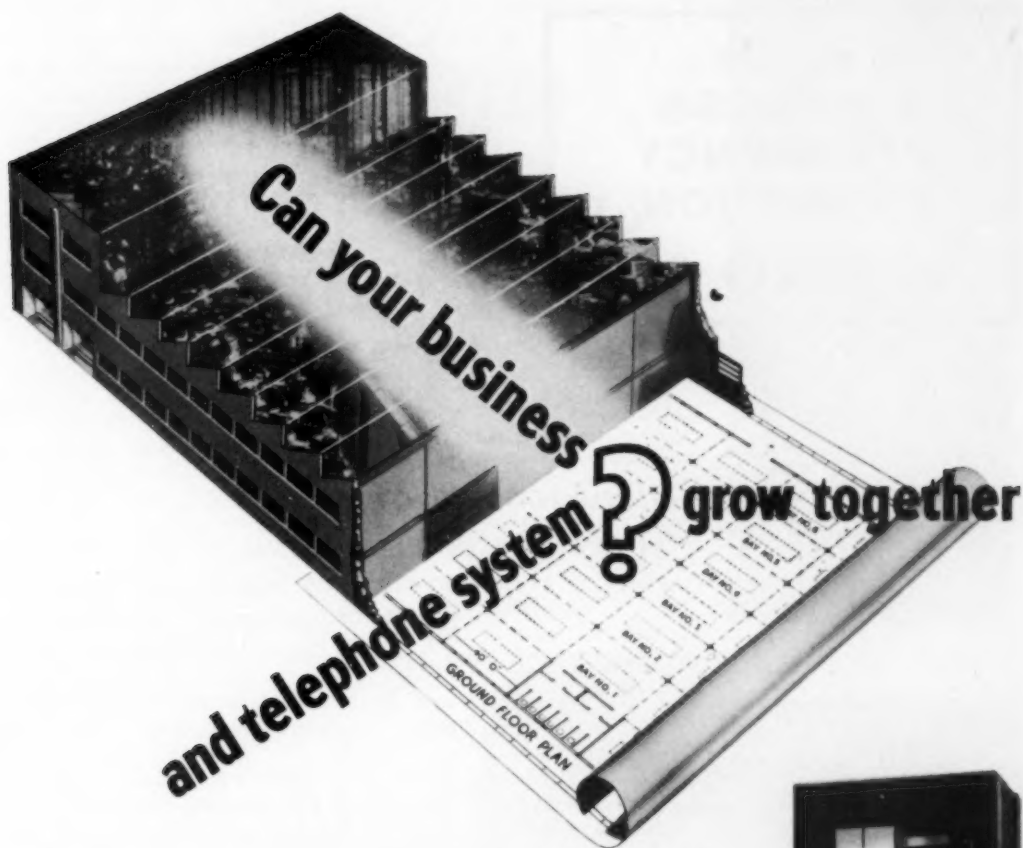
The company say that when the extension is completed, their facilities for ramjet development will be among the most comprehensive in the world. Moreover, the knowledge gained in this specialized project will have wider implications in the whole field of supersonic flight.

★ ★ ★

It is often suggested that low rates of income tax (made possible by the absence of costly defence commitments) have played a significant part in the German renaissance. But this, it seems, is a myth. Recently the Federal Minister of Finance released some figures which attempt to put tax comparisons on a sound basis by taking into account social insurance and other payments. These show that in Germany the State and its subsidiary organizations take no less than 33 per cent of all earnings, whereas in Britain the corresponding figure is 30 per cent.

Of course, there are many other things which have to be considered

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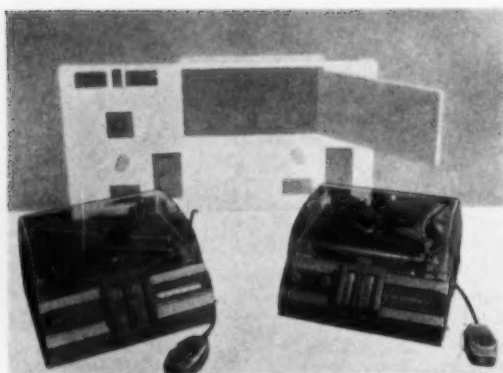
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when tax comparisons are made. Germany, for example, has a capital property tax which is unknown in Britain; also an 'equalization' tax which is intended to level out the differences between those whose property was destroyed during the war and those whose property was spared. In Britain, death duties are generally higher than in Germany, but industry is allowed more liberal terms for depreciating machinery and plant.

All things considered, the Federal government believe that German tax burdens are heavier than those of other countries—though until this year's British Budget they were certainly lighter at the top executive level.



INDUSTRY'S PRESS

RESULTS of a survey undertaken recently by the British Association of Industrial Editors reveal the extent to which the house journal has become a major—and expensive—line of communication in industry.

An analysis was made of 253 journals. Their average circulation was 8,500, and the average cost per copy was 11d. The association believes that more than 1,200 house journals are published in Britain, which indicates a minimum total circulation of 10,000,000—and a total annual cost of £3,250,000.

Nearly half of the 253 journals are published quarterly: 22 per cent are monthlies and 18 per cent bi-monthlies, the remainder being issued at varying frequencies.

A breakdown of 'primary' readership is: Internal 45 per cent; internal and external 41 per cent; external 11 per cent; and 'other' 3 per cent. Magazine formats outnumber newspaper formats by seven to one.

About one-third of the journals have full-time editors. In the remaining cases editorial duties are combined with other work.



"A change of job often results in a considerable forfeiture of pension rights. On balance, the mobility of

JUNE, 1957

PEOPLE PRODUCTS PLACES 1

EXHIBIT A—Tallest exhibit ever shown at Earls Court, this structure was the centrepiece of the stand organized by Chevron Structural Units Ltd. at the Factory Equipment Exhibition last month. It was 45ft. high, made entirely of slotted steel angle.



EXHIBIT B—Costain-John Brown Ltd. showed this glass-reinforced plastic caravan at the Instruments, Electronics and Automation Exhibition. Fitted out as a test shop, it can test and calibrate instruments on the actual sites where they are used.



KEY WORKERS—Albert Walker (left) and Annie Birch have worked in the lock industry for 56 and 55 years respectively. They were among 126 Yale and Towne Mfg. Co. employees to receive awards recently for 25 or more years' service with the company.

senior executives without penalty would appear to be beneficial both to individuals and to industry as a whole. In some cases, at least, it would remove a disincentive to fresh endeavour"—W. H. Leather, in a paper "Incentives for Top Management", at the B.I.M. Scottish conference last month.

The BUSINESS article on Executive Pensions in May, 1955 strongly emphasized the importance of transferability. Recent political proposals for a national pension scheme have stressed the same point.



WISDOM from WESTMINSTER

"I am told that foreign manufacturers of consumer goods are employing more women to sell their wares overseas, and that it is generally very successful. I wonder whether we could not with advantage do the same."

"I am sure there are many British saleswomen who would make the success of selling consumer goods which Commander Whitehead, with his beard, has made in the soft drink trade in the U.S.A."—Sir David Eccles, President of the Board of Trade, in the House of Commons.

"I should like to see some managements begin to realize what management means. I have had something to do with man-management in my 30 years in the Army, and I suggest that if some of these gentlemen want good relations in their industries, the finest thing they could do would be to employ some of the officers who will now be leaving the Services. We might then get better feelings in industry."—Brigadier O. L. Prior-Palmer, M.P. (Cons.), in the House of Commons.

"It is a truism that there are no such things as bad troops; there are only bad officers. I think it is probably equally true that there is no such thing as a bad workman; there is only bad management."—Lord Coleraine (formerly Mr. Richard Law, M.P., a director of Horlicks Ltd.) in the House of Lords.

PEOPLE PRODUCTS PLACES 2



CHIEF PACKER—John Castle, sales development manager of Bowater-Eburite Ltd., was a founder member of the Institute of Packaging in 1947. Now, when membership has grown to 2,000, he becomes its chairman.



SHOWING THEIR METAL—The Copper Development Association have opened London premises, of which this is the newly-inaugurated public exhibition room. Attractive displays show some of copper's many uses, and an information service deals expertly with technical enquiries from users.



MODERNISTIC—Italian artists and designers have transformed British Olivetti's Kingsway, London, showroom. The balcony screen—consisting of alphabets and sign languages—is functional, and hides administrative offices. The mural on the right is a photogram based on type bars. Though the showroom is small, an illusion of roominess has been created.

Entirely by Catesbys Contracts



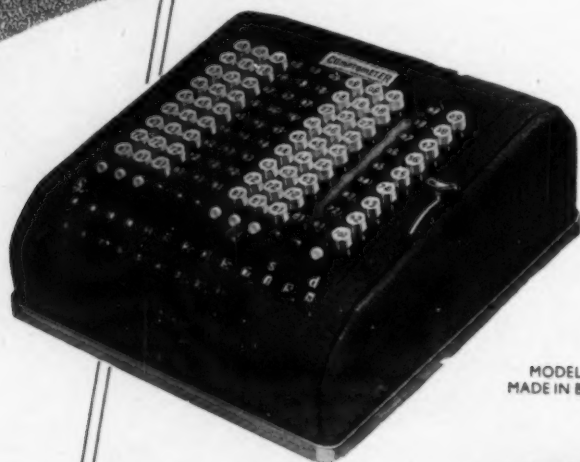
Coffee room for Arthur Guinness Son & Co. This Coffee room was entirely designed by Catesbys Contracts for the administrative staff of Arthur Guinness Son & Co. (Park Royal) Ltd. The scheme shows in use Catesby designing, decorating and furnishing.

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TALKING POINTS

INSPECTING THE INSPECTOR

Does the State of His Liver Cost Money?

HOW consistent is your inspection department? Is there some truth in the inspector's half-joking admission that the number of rejects indicates only the state of his liver?

Details of research into this rather neglected subject were given by R. M. McKenzie at a symposium held recently by the Ergonomics Research Society. If the results of the tests which he described are typical, the businessman has some cause for alarm. For they suggest that many manufacturers are either losing goodwill by sending out unsatisfactory products, or (which seems more likely) are losing money by scrapping satisfactory products.

In one test, a batch of 50 small parts was inspected for surface finish by three viewers on three different days. The number of rejections on each day were: Viewer A, 11, 14 and 10; Viewer B, 5, 11 and 19; and Viewer C, 5, 14 and 28. Then the chief inspector, without knowing these results, rejected only one part out of the whole batch.

Another firm assumed that men employed on the visual inspection of soldered joints would pick up about 95 per cent of the faults. But when, as an experiment, 20 faults were set up in a batch of 1,000 components, 39 trained inspectors spotted, on the average, only 83 per cent of them.

An important factor, according to Mr. McKenzie, is that in most works the inspection supervisor has to concentrate on the inspection of products rather than on checking his own inspectors' ability to inspect.

Once the degree of inconsistency is known the problem becomes manageable. For example, experiments

suggest that seven-hour training in the use of a micrometer can reduce errors by as much as 75 per cent.

Where subjective judgments are involved, the inspectors, as well as their gauges, need periodically to be 'calibrated'. Instructions must be clear and detailed. If training is informal (as is usually the case), the men's inspecting ability should at some time be checked objectively.

Plain Words

TECHNICAL subjects seem to get more and more technical. Specialists seem to have more and more difficulty in talking layman's language.

It is refreshing therefore to note the title of a lecture by Dr. N. A. de Bruyne, managing director of Aero Research Ltd., at the Royal Institution: not 'The Chemical and Physical Properties of Metal Bonding Adhesives', but simply 'How Glue Sticks'.

Abdication?

TODAY there is some temptation for the businessman to regard the shop steward as the moustachioed villain of industrial dramas. Yet many firms—especially those outside the main industrial areas—see him in an entirely different light.

One works superintendent told BUSINESS recently: "Our relations with the unions are so good that the shop stewards have practically become a part of management. If an employee is a bad timekeeper or

has a bad absenteeism record, his chargehand doesn't go and see the supervisor—he asks the shop steward to do something about it. And the shop steward invariably gets the employee to pull up his socks."

A happy state of affairs. But reactionaries (and others perhaps) may question the wisdom of a management relinquishing even a little of their authority in this way.

Discipline is essential in all undertakings. Moreover, it is inseparable from the other functions of leadership. When a firm relinquish authority on small issues, are they not running the risk that employees will be encouraged to look for leadership in the wrong direction if the situation changes and much bigger issues are at stake?

Things to Come

WAS the Dome of Discovery at the 1951 Festival of Britain a discovery in its own right? At a recent meeting of the Associated Plant Engineers, Vice-president E. C. Stevens suggested that it might have been the forerunner of factory buildings in the Automation Age.

Mr. Stevens was presenting a paper on trends in the design of factory and their equipment. Dome buildings, he said, gave the maximum volume for a given surface area. Theoretically there was no limit to their span.

Automatic machines would be packed into such buildings economically. There would probably be cat-walks and skeleton floors for the small team of supervisors and engineers who would look after the plant.

We wonder whether this form of construction will be linked with an idea put forward some time ago by a far-sighted architect who visualized the Factory of the Future in the shape of a catherine wheel, with raw materials being delivered at the centre via a tunnel, and finished products being thrown out at a convenient point on the periphery. Such an arrangement, he explained at the time, would give all the advantages of an in-line layout without the disadvantages of having to build long, thin factories.

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Here is the first case-history of its kind—a detailed description of the way a British firm tackled the administrative, technical and ‘human’ problems of adopting electronic data-processing on a relatively modest scale. Their investigations enabled them to make substantial cash savings even before the computer was installed.

Getting Ready for a Computer

By PETER SPOONER

THE pioneer's lot is in some ways a hard one but it has its rewards. His experience is gained by trial-and-error; he makes mistakes and follows misleading trails which those behind him may well avoid. The compensations are the satisfaction of being first in the field, and the knowledge that he has a good chance of remaining one jump ahead of the others (because there is no better experience than first-hand experience).

It was this outlook and the thought of these compensations that made The Morgan Crucible Co. Ltd. embark on an electronic computer project at a time when other firms were only studying the idea curiously. As a result, they have become the first British company to purchase and put into operation a ‘standard’ medium-

sized computer built specifically for routine office work. (This claim disregards, with some justification, the number of firms which are already using the simpler types of electronic multiplier or calculator, with only limited programming facilities.)

Now in Action

Their machine, the first production model of the *Hollerith Hec 4* general-purpose computer, was delivered in November last year. It has just begun to take over administrative routines which were previously done on conventional accounting equipment.

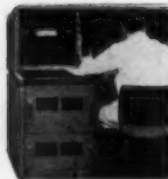
The company's investigations and preparations have been going on for more than four years, and it is with the activity of this period—of

great interest to all firms who are considering the possibilities of electronic data-processing—that we are concerned here.

First, a few details about the company. Morgan Crucible manufacture crucibles, refractories, carbon and graphite products, radio components and furnace elements. Altogether, they produce 20,000 different lines, which are sold in quantities from two to 500,000.

At their Fattersea, south-west London, works they have nearly 4,000 employees, of whom about 900 are staff. Although they are an old established company, their interest in administrative systems is distinctly up-to-date, and for many years they have had an active office methods department. They consider that

The Machine They Chose



M.A.C. (Morgan Automatic Computer) is the first production model of the Hollerith Hec 4 general-purpose computer. The installation consists of four units; gang punch, computer, control desk and tabulator.

The computer programme, punched into a set of cards, is read on to the machine's magnetic drum 'memory' at the beginning of each job. Input of both 'standing' and 'change' data is also by punched cards, and the results of the machine's calculations are either punched into a new set of cards or printed out in the form of payslips etc.

management-labour relations in the organization are above-average.

To the business executive who is trying to assess realistically the prospects for employing computers on office work, there are three particularly important features of the Morgan Crucible project:

- 1—Experience has confirmed the company's original estimate that it would take at least two years of hard work to prepare for the installation of a medium-sized machine.
- 2—The company's aim has been to gain experience, and decide future policy, by operating on a scale which will enable them at least to recover the cost of the operation within five years—in cash savings rather than in 'intangible' benefits.
- 3—An intensive O. & M. investigation to find suitable jobs for the computer produced substantial benefits long before the machine was delivered.

'Project M.A.C.' (the initials stand for Morgan Automatic Computer) was set in motion at the beginning of 1953. From the outset it was directed by four people; the Company Secretary, the Controller (who retired

last year), the office methods manager and a member of the company's Central Research Department.

This small group operated as a team and not, the company emphasize, as a committee. The distinction reflects the management's belief that the 'working party' system was the only practicable method of tackling a project which was going to affect so many procedures and throw up so many unfamiliar problems.

Wide Experience

Because the team encompassed a wide range of knowledge and experience—company policy, accounting, administration and technical know-how—they were in a position to examine these problems objectively and to relate them to the company's activities as a whole. Moreover, each member of the team had spent many years in the organization and was thus familiar with its 'feelings' as well as its practices. This was important, in view of the danger that executives and others might get exaggerated ideas about the way in which an 'electronic brain' was going to affect their jobs.

The research engineer knew very

little about clerical work and had to be coached by the office methods manager. But no attempt was made to turn him into an O. & M. expert. The other members of the team recognized the value of being kept on their toes by the "why's" and "why not's" of someone from outside their own field.

Their plan of action was divided into three parts: *First*, to investigate the practicability of using a computer in the organization; *second*, to consult manufacturers in an attempt to find a machine which would suit their estimated requirements; and *third*, to reorganize the clerical systems which would eventually be taken over by the computer.

The team started with a clear idea of what they were trying to do—and of what they were not trying to do. There was no merit, they decided, in simply transferring work from one piece of equipment to another. Nor was it realistic to set themselves the target of eliminating X number of clerks. The aim of Project M.A.C. was to increase the efficiency of the company's administration. This might be done by installing a computer and building a new system around it; but a more sensible approach was to try to design better methods in which (an important, if subtle, distinction) the special capabilities of a computer could be used advantageously, but were not absolutely essential.

It was also decided that the introduction of electronic data-processing should be 'evolutionary rather than revolutionary', and that long-term policy should be decided in the light of the experience gained with one relatively small computer. For this reason the team were set the task of finding a machine—at 'well under £50,000'—which could be expected to pay for itself within a period of five years.

During Phase One of the project they made a general study of possible applications, assessed the difficulties (thereby reducing to a more realistic plane some of the over-enthusiastic ideas with which, inevitably, they had begun) and drew up a list of minimum requirements. Individually, they read

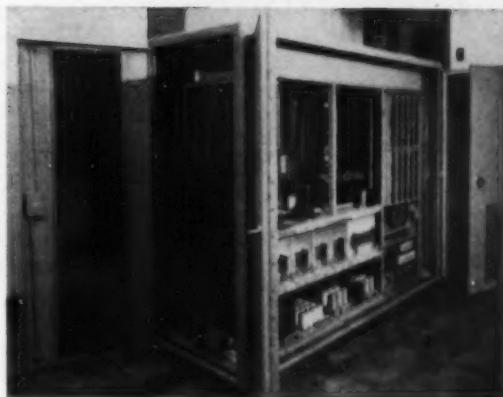
widely on the subject of electronic computing and attended lectures and training courses. Thus equipped, they were able to think and talk in practical terms when they opened their discussions with computer manufacturers.

That was three and a half years ago. The development of commercial computers were then in a honeymoon period. Some manufacturers were inclined to think that they had in their 'magic boxes' a cure for all administrative headaches. The Morgan team took the more sober view that the success of a computer project would depend on close and continuous liaison between manufacturer and customer. They accepted that the manufacturer knew how to make computers, but maintained that the customer knew more than anyone else about his own paperwork problems. It was essential therefore to find a manufacturer whose development plans were sufficiently flexible to take into account the individual requirements of the M.A.C. project.

The choice was limited, especially in view of the financial conditions which the company had imposed on themselves. Their decision to adopt the commercial version of the *Hec* computer (originally designed for scientific and mathematical use) was influenced, to some extent, by the fact that the company had already had about 17 years experience of *Hollerith* punched card accounting. Moreover, the *Hec 4* general-purpose model was still at an embryonic stage and the manufacturers were ready and willing to build into the first machine the features which were broadly specified by The Morgan Crucible Company.

A very important consideration was that the cost of the computer, spread over the five year period, would be less than the rental charges

Maintenance is simplified by the extensive use of plug-in units. Nevertheless the company have taken great pains to establish an adequate 'escape route' for their computer systems



for the existing electro-mechanical equipment which it would almost immediately replace. Therefore the team were able to place before their board of directors a straightforward proposition in which the estimated savings were in hard cash, rather than in 'intangibles' like the value of an improved service to management (although the team hoped, that, in time, these would become the more important savings).

Taking a Chance

Some of the technical details of the computer were then 'in the air'. In this respect the project was distinctly speculative. But the team, and the management, accepted the fact that speculation was an inseparable part of pioneering work. The negotiations to purchase the computer were concluded at the beginning of 1954: one year after Project M.A.C. began, and nearly two years before the machine was actually installed.

Phase Three of the operation was a period of intense activity. Although the team concentrated on four tasks—salary accounting, wage accounting, statementing and invoice

analysis—it was not simply a question of preparing to transfer to M.A.C. the same routines which were then being done on other equipment. Each routine had to be examined and modified from start to finish within the framework of the company's computer policy.

Although the team regarded the reduction of clerical labour as a subsidiary aim, they decided nevertheless to direct their first efforts at salary and wage accounting, a bread-and-butter job which has been used to illustrate the possibilities of electronic data-processing ever since Lyons unveiled the *Leo* installation. This decision was made for several reasons:

► Electronic payroll accounting was a good way of gaining computer experience.

► The routine was well defined.

► It demanded a strong machine discipline—and this, the team believed, was an essential feature of any form of electronic data-processing.

► There were plenty of reliable system checks—another essential during a period of experimentation. (Any mistakes which slipped past the machine would be picked up immediately by one of 3,000 checkers with a personal interest in the contents of the paypackets.)

► By demonstrating that the payroll could be computed accurately and on time, confidence in M.A.C. could be established quickly. Thus the way would be cleared for more advanced systems.

Above all, the team's investigations

The company's aim has been to gain experience on which to base future policy, at the same time operating on a scale which will enable them at least to recover the cost of the operation within five years—in cash savings rather than in 'intangible' benefits.



had produced pretty conclusive evidence that—as far as the Morgan Crucible payroll was concerned—the job was one which a medium-sized computer could handle profitably.

The investigation threw up another important fact. Originally the team had planned to 'computerize' the payroll from A to Z. But during their exhaustive study of the routine they discovered that to start at A would be an uneconomic proposition.

Complicated Payroll

This was largely due to the complicated nature of the company's payroll. Within the organization there were six different types of payment. About 60 per cent of the employees were liable to be switched at a moment's notice from timework to piece-work, or vice versa.

The payroll system had been developed progressively over a period of many years. Already much of it was mechanized. And as a result of their investigations the team came to the conclusion that the most economic system would be to use the computer in combination with conventional accounting machines. Working on these lines, they spent many months on modifying the routines and re-designing forms.

Considerable attention had to be paid to the question of providing an adequate 'escape route'. It was impossible to go into a project of this sort without some misgivings concerning the reliability of computers. In this case, moreover, the problem was accentuated by the fact that the company were installing the first production model of a new machine. If a fault developed at a critical stage of the pay procedure, there would be no chance of transferring the work to another computer. Therefore the team had to tackle the problem by

establishing emergency arrangements within their own organization.

This led to a new conception of the project—one which enabled the company to make big savings some time before the computer arrived on the scene.

As an intermediate step, they installed two pieces of equipment: a 542 electronic multiplier, and an electro-mechanical tabulator with the same print output as the computer (and thus capable of handling the same forms). Because of this set-up, they were able to design new salary and wage procedures which could be put into operation immediately, yet were capable of being switched to the computer, without modification, when it became available.

The electronic multiplier replaced two conventional punched card calculators, and its cost was offset, to some extent, by this saving in rental charges.

Combined System

The new procedures were based on the 'combination' which was mentioned previously. *Comptometers* were used to calculate 'time earned per day per cost centre'. Then the multiplier and its associated punched card equipment—acting as a 'stand-in' for the computer—took over the routine and (1) converted 'time earned' to gross pay; (2) applied P.A.Y.E. and other conditions prescribed by the factor cards; (3) updated the cumulative records for each employee and punched them into a new pack of cards; and (4) printed out the payslips.

A small test run was made in a 'difficult' department where all six methods of payment were used. The results were good, and within a short time the new procedure was being applied throughout the organization.

This produced immediate benefits. In fact, the company are now convinced that the improvements made possible by the introduction of the multiplier are sufficient, in themselves, to justify the investigation, even if it had been necessary to shelve the original project.

The improved system had been running smoothly for some time when the computer was delivered. No attempt was made to 'change horses' immediately; instead, a period of several months was devoted to experimental work, including 'dummy runs' on sections of the payroll.

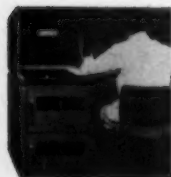
A few weeks ago, M.A.C. took over the salary routine. As a precaution, the first run was made in parallel with the existing set-up. The same thing is now being done with the wage routine.

In the event of trouble, the electronic multiplier will provide the 'escape route'. At first it may appear that the company have been forced into the uneconomic practice of providing two sets of equipment for one set of jobs. But this is not the case. The situation can be seen more clearly by considering that in almost every routine there are different levels of output.

In payroll accounting, the minimum level is represented by the payslip. This is what the multiplier installation provides. The computer goes much further by providing high-level output in the form of immediate analyses for control purposes. If a computer failure causes an emergency the payslips will still be available on time; and however great the long-term value of the management information, its temporary absence is unlikely to have serious repercussions.

In any case, it is not intended that the multiplier be kept for emergencies. Normally it will be employed profitably on other jobs. That is one outcome of the full-scale O. & M. investigation which preceded the installation of the computer.

At this stage, it is difficult for the company to assess fully the advantages of putting jobs on to a computer. But they have already established that there are big savings in time. For works employees, the pay



No attempt was made to turn the research engineer into an O. & M. expert. The other members of the team recognized the value of being kept on their toes by the "why's" and "why not's" of someone from outside their own field.



Ancillary equipment—including punches and verifiers—prepares cards either for M.A.C. or for the electronic multiplier introduced at an intermediate stage of the project

week-ends on Monday mornings and their wages are paid on the following Thursday. Hitherto the payslips were not ready until Wednesday; now the computer finishes the job on Tuesday. Moreover, all analyses are run off at the same time, giving the management information which, in the past was always two weeks in arrears.

To prepare the payslips and analyse the data for 3,000 works employees, the computer takes about $7\frac{1}{2}$ hours. Salary statements for 900 employees are run off in about $3\frac{1}{4}$ hours. This reveals the effect on computing speed of using pre-calculated 'time earnings' in the first routine, and thus reducing some of the work to a straightforward listing operation.

The M.A.C. team have taken great pains to write 'breakdown conditions' into the payroll programme. After the cards for each batch 128 employees have been processed, the computer checks the information which has accumulated in its 'memory' system, without wasting time by converting this information from the binary notation in which the computations are made.

If a discrepancy is found, there is no need to go back to the beginning of the run, but simply to the beginning of the current batch. Moreover, 'suspect' cards which show, for example, that an employee's wages are abnormally high or low, are automatically thrown out by the computer for investigation in the wages office.

A minor complication is that, for many years, the company have used a 24-field payslip, which shows the

employee exactly how his earnings are computed. This could have been streamlined when the new routine was introduced, but the company believed that the goodwill which it had created was worth more than the advantages of ultra-efficiency. Certainly it would have been 'bad psychology' to imply that the computer was unable to do as much as the system which it was displacing. As it was, a few small changes in format were made after consultation with the employees' representatives.

Staff 'In the Picture'

This is an example of the way in which the company have handled the human problems of introducing a computer. At all stages of the project, the team have appreciated the importance of keeping in the picture the employees whose jobs were going to be affected by it—and those who might think that their jobs were going

to be affected. (In view of the sensational publicity which has surrounded the development of computers, this meant almost everyone in the organization.)

The first aim was to dispel uncertainty arising from the 'redundancy bogey'. The team realised that the employees who might have been tempted to leave on this account were the very people whom the company could not afford to lose during a period of transition, when there was more work than ever for them.

Through works committees and other established channels of communication, employees at all levels were kept informed of the progress of Project M.A.C. An assurance was given that people 'displaced' by the computer would be found other jobs. For it was safe to assume that any staff reductions would be spread over a long period and would thus be covered by the simple policy of not replacing employees who left in the ordinary way.

But to dispel uncertainty was not enough; the company had also to win the active co-operation of their staff. From experience they knew that, in any system, most clerical errors originated in the written information on which the system was based. Because of the speed of electronic computing it was essential that the staff responsible for original entries should appreciate the need for greater accuracy than ever before.

There was no question of making arbitrary changes in the departments concerned. Before any routine was



In siting a computer it is important to avoid sources of electrical interference—heavy machinery, lifts, etc. A direct line from the local sub-station to the computer room ensures a 'clean' supply, but is not essential



It was essential to dispel the 'redundancy bogey.' For the company realized that employees who might be frightened into leaving were the very people whom they could not afford to lose during a period of transition.

varied, the reasons and the implications of the change were discussed fully with the supervisors and employees who were responsible for the work. This produced benefits in its own right: in some cases junior employees had a chance to see for the first time how their jobs fitted into the administration as a whole.

As soon as the computer was installed, selected groups of staff were invited to see it in action on test runs. This invitation was also extended to works representatives, to prepare them for changes in methods of recording original data.

The process of 'putting people in the picture' was directed at all levels. Special attention was paid to department supervisors, who might easily have got the impression that their own authority was going to be undermined by the new development.

Reports to Management

The team also made sure that top management were given reliable information concerning the implications of the project to which they had given their blessing. (This may seem an obvious step to take, but obvious steps are sometimes overlooked.) The task was simplified by the fact that the directors had started with a genuine interest in the subject, rather than a vague feeling that "we ought to do something about getting a computer". One of them had attended a general course on computer applications, while others had examined data-processing installations in the U.S.A.

The new control techniques made possible by the introduction of a computer were discussed at several meetings of senior executives. It was emphasized that the main functions of a commercial computer were to provide reliable and timely infor-

mation; to forecast the trend of events and thus enable anticipatory control, based on facts, to become a more profitable pursuit of top management; to disclose exceptions to budgeted expectations and thus highlight the points at which management decision was needed.

At the same time, executives were warned of the danger of a 'statistical honeymoon' in which facts were requested simply because it was known that the computer was capable of providing them. A clear explanation was given of the amount of work which went into the preparation of a computer programme.

The company had decided at an early stage of the project that if they were to assess their future requirements at the end of five years, they would need to appreciate fully the technical aspects of the subject. In the words of one member of the investigating team: "It was not enough to have a mysterious 'electronic box' in our office—we insisted on a complete understanding of how it works".

One of their tasks has been to draw up a comprehensive training manual which describes the machine, its capabilities, the way it works and the way it is used. A copy of this book has been given to all directors and managers. In future, reports of machine results and O. and M. investigations will keep the management fully informed of the effects of a computer in action.

Training Personnel

The long period between the inauguration of the project and the delivery of the machine gave the company the opportunity to build up a strong team of specialist—for programming, coding, maintenance, etc.—with a working knowledge of each other's problems. In their opinion,

it is impossible to place too much emphasis on training the personnel who are associated with a project of this sort. For example, the engineer spent nine months with the manufacturers: three in their training school and six in their works, where he participated in the final construction and testing of the machine.

Now that the computer is proving itself on the pay routines, other jobs will soon be switched on to it. First in line are the preparation of customers' statements and the analysis of invoices. Later, it is proposed to enter the fields of stock control and production control. The company's Central Research Department has first option on spare computer time when these clerical routines have been absorbed.

For some time, however, most of the activity will be directed at bread-and-butter work. This is a deliberate policy. In the first place, the team's investigations have shown that, contrary to some reports, such jobs can be 'computerized' with profit.

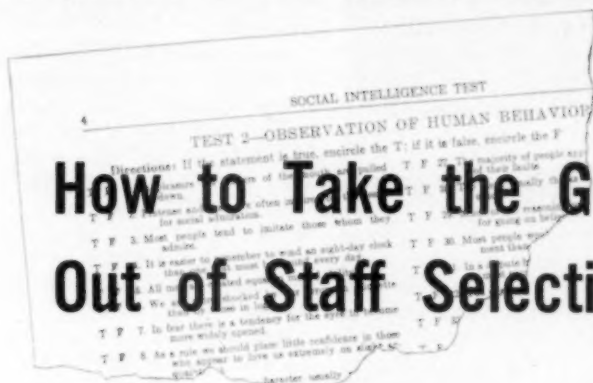
Much depends, in their opinion, on the question of machine loading. For example, to deal speedily with the monthly procedure of sales analysis the company have had to maintain an additional electro-mechanical tabulator which is only lightly loaded at other periods of the month. Transferring the work to M.A.C. will probably allow them to throw out this tabulator, thus saving about £2,500 in annual rental charges—about one-third of the cost of the computer over five years.

The second point—more important in many ways—is that gaining experience on easily 'encompassed' jobs which pay their own way will eventually enable the company to exploit fully the value of electronic data-processing in the more advanced fields of management control.

Whether they ultimately decide to replace M.A.C. with a bigger and more versatile machine, or to run another small computer in parallel with the first machine, remains to be seen. Wisely, Morgan Crucible are leaving that decision until they can assess the results of their five-year plan.

END

A Consultant's New Approach Showed Them



How to Take the Guesswork Out of Staff Selection

Premier Supermarkets Ltd. had to create a labour-force from scratch and develop a new type of manager when starting operations in 1951. At first staff turnover was high, promotion mistakes expensive. Then an American consultant tried novel test procedures—which worked

Which would you rather do: (a) Build a hand loom? (b) Derive mathematical formulae for predicting business trends? (c) Make a survey to discover youths' attitudes on attending church? Is it true or false to say that most people would rather admit having bad judgement than bad memory? Do you remain calm when a friend is in pain?

ANSWERS to questions like these are helping Premier Supermarkets Ltd., London, a subsidiary of the Express Dairy Group, to overcome a serious staff problem which, a year ago, was threatening to curb the company's natural development. The questions are part of an American consultant's unorthodox approach to selection tests for personnel of all grades. The system of which they form a part has considerably reduced labour turnover at Premier, cut wage costs per £100 sales, and allowed the firm to envisage a 100 per cent expansion within the next 12 months.

The consultant, Victor W. Eimicke, Ph.D., calls himself a 'business and industrial psychologist'. His organi-

zation in the U.S. is retained by over 150 companies, including supermarket concerns, to advise primarily on personnel matters. Premier read of his successes, and their chairman, Walter Nell, had a meeting with him during a visit to North America. As a result of that meeting, Dr. Eimicke was asked to come to England and take stock of Premier's headaches.

The main difficulty facing the company was that they were operating in

By STEPHEN ROSE

a field that was new to this country. When they started operations in 1951, they had no pool of trained labour to draw upon. For supermarket operations require not only intelligent and responsible counterhands, of which the retail trade is generally short, but also a special type of manager at various levels. It is not enough for a supermarket executive to know the ins and outs of, say, greengrocery. He must also be able to supervise large-scale meat operations, and have a grasp of other specialized retailing into the bargain.

The firm were therefore forced to select personnel in the hope that they would respond to training, and they had to do so in alarmingly large numbers. In fact, during a rapid period of expansion, when it was vital to put supermarkets firmly on the map in this country, too much of Premier's administration had to be in the hands of relatively inexperienced men. Mistakes in selection and promotion were expensive and not infrequent. How could they be avoided?

The consultant arrived in March last year. He spent a month getting to know the organization and studying its operations. He was able to introduce pre-packaged training programmes from America which, with slight adjustments of terminology and approach, were suitable for speedy training of the firm's various grades of staff.

But it was not until Dr. Eimicke returned home that his major project was able to start. First of all, he sent Premier a detailed survey and analysis of the company as he saw it. He dwelt at some length on the various factors which had to be taken into account—growth, structure, management—and recapitulated the new training methods which he felt the firm needed. Then came the main point:

"The need for a scientific selection procedure is paramount. The staff turnover percentage for Premier Supermarkets Ltd., is excessive. *There is no doubt that staff turnover can be reduced through more efficient selection.* We will establish a selection procedure, based on experimentation involving all present employees of Premier Supermarkets Ltd."

At first sight, the procedure to which he refers may seem to be no-



Says consultant Victor Eimicke: "The need for a scientific selection procedure is paramount." But his method is not supposed to replace the traditional interview. It supplies extra facts which otherwise only time could bring to light.

thing more than a number of the usual 'psychology' or 'intelligence' tests which industry has used with greater or lesser success for many years now. Certainly, the tests he brought to Premier are standard ones. But his use of them is original.

The selection theory, which he evolved for his doctorate thesis, is based on the reasonable assumption that a person who performs a particular job successfully must have temperament, aptitudes or other characteristics which differ from those of a person who is doing or has done that same job unsuccessfully. He sets out, therefore, to find a test (no matter how remote its actual subject matter) which, by isolating some of these characteristics, clearly differentiates between the successful and the unsuccessful operative. When trial and error have produced such a test, it can become the 'norm' by which future applicants may be judged for that job.

The point is this: a man might fail to show the necessary characteristics to be able to succeed in a repetitive job, but might well have the intellectual stamina to become a top executive. Therefore Dr. Eimicke carefully stresses that failure in a test is only relative to the job for which the candidate is being considered, and need have no bearing whatever on the absolute quality or value of that candidate.

Here is how this method was applied at Premier. In his report, the consultant asked to be sent a list of all the company's staff, classified by job and grade. He then asked that all executives should classify the people below them as either poor, good or very good at their jobs. From the replies to both requests, he was able to compile criterion groups of good and bad workers for every position

within the organization. He could now start a process of trial and error to determine which tests of the many available were able to distinguish clearly and reliably between these groups.

Almost every Premier employee underwent two or more different tests. Results were flown back to America for analysis, and by this means five tests were isolated which fulfilled the required conditions:

- ▶ Personnel classification
- ▶ Social intelligence
- ▶ Preference
- ▶ Temperament
- ▶ Supervisory ability.

Intelligence tests often invite scorn and derision, and indeed in these five there is much that seems amusing, baffling or downright idiotic. But in Premier's experience they have proved their worth.

The personnel classification test (which everyone at Premier takes) is in two parts. The first deals with word associations such as this:

Pick out from the list below, the two words missing from this statement: is to newspaper as manager is to

- 1—reporter 2—column
- 3—advertising 4—editor
- A—president B—publisher
- C—store D—employer

Part two, more straightforward, deals with arithmetic. There are 20

questions ranging from simple addition and division to cube roots and progressions.

The temperament test is also taken by everyone, and is often baffling to answer truthfully. "Are you more restless and fidgety than most people?" "Do you often prefer to spend an evening alone?" "In the morning, do you bound out of bed energetically?" There are no fewer than 140 such questions, to which candidates must answer either 'Yes', 'No', or '?'. .

Answers are marked in little boxes on a special form which binds loosely into the question booklet. The pages of questions are staggered, so that as they are turned, a further slice of the answer sheet is revealed.

Self-scoring

When the candidate places his cross in one of the answer boxes opposite the question, his mark is reproduced on the reverse side of the sheet, which is carbon-backed. This allows a self-scoring device to function. Its mechanics are ingenious, and instead of producing abstract 'ratings' or 'quotients', it shows in what proportions the candidate possesses various personality and temperament characteristics, identified as Active, Vigorous, Impulsive, Reflective, Dominant, Stable, etc. In other words, rather than label an employee as active or stable or reflective, the test will produce a 'personality portrait' containing all these elements in varying quantities.

It is the work of a trained psychologist to work out what bearing a certain personality portrait may have on a particular job, but Dr. Eimicke has given Premier a number of 'norms' or tolerance limits for guidance, as it is obviously impracticable

Selection tests at Premier do not try to rate candidates' intelligence. They are designed to show only whether or not an applicant would be a success at a particular job. When a full battery of tests has been taken, U.S. psychologists build up a 'personality portrait' from the results

to send all tests to America for analysis. Premier are thereby able to work this test themselves, at least in the case of lower grade staff.

They can 'measure' a candidate's aptitude for a given job by comparing test results with Dr. Eimicke's specifications. Alternatively, working with these norms, it is often possible to see that, although an employee is most unsuited to his or her present job, and is in fact making a mess of it, a different department will offer almost ideal scope for that employee's abilities.

The preference test again requires a special answer form to be used.

"Which would you rather do: A. Build bird houses? B. Write articles about birds? C. Draw sketches of birds?" Or: "1. Help young people select vocations? 2. Design new fabrics? 3. Make estimates on the cost of printing books and circulars?"

One feature of this test is that it cannot be assessed by anyone other than a trained psychologist. It is only given to candidates who take the complete battery of tests, in which case the papers are sent back to America for analysis.

The test with which most laymen will want to quarrel is the one known as the 'Social Intelligence' test. It is in two parts, the first of which deals with problems like this:

"A man of 60 years, who has been a faithful employee in your business for 25 years, complained that his work was too heavy. It would be best to (a) tell him to go back to work or you'll fire him; (b) dismiss him and get a younger man in his place; (c) give him a raise in salary so that he won't object to the hard work; (d) lighten his work."

The second section is an adaptation of the parlour game "True or False?" Is it, for instance, true or false that "What will make one person happy can safely be assumed to make others happy?" Candidates are asked to circle a T or an F opposite the statement to indicate their answer.

Where this test is open to criticism—



The supermarket manager must have command of an unusually wide range of knowledge. Butchery, pre-packaging, dry goods, fruit and vegetables, though normally specialized departments, must all be familiar to him. That is why Premier had to create a new type of manager for the business

cism—and especially the first part—is in the fact that it deals with 'right' and 'wrong' answers, without having any absolute basis for judging right and wrong other than the personal views of the psychologist who set the questions. In the case of the ageing employee, for instance, the copy-book answer is obviously (d). But many people would have much to say for (b), given a certain state of affairs in a firm. Furthermore, in questions like this, candidates will certainly try to give the 'popular' answer rather than the one they themselves believe to be correct.

Sceptics Answered

Sceptics have put these points to Dr. Eimicke, but he has an answer for them. He says: "Granted that it would be possible to anticipate the answers one is supposed to give (and I don't for a moment admit that this is so) our conclusion would be that the candidate who succeeds in doing so will be able to put up a convincing façade in everyday life, regardless of his true feelings. In other words, he would be 'socially intelligent'.

"And anyway, in our experience, everyone *thinks* they know what the test is trying to get them to say, and everyone tries to put down the answers which they *think* they are supposed to give. So everyone is

really working on equal terms after all."

Whatever the merits of the case in theory, in practice it has worked remarkably well. Premier now administer two tests to everyone applying for a job: the personnel classification and temperament tests. When they prepare to open their next supermarket, they will hire a room in the area, probably in quite a good hotel, and will ask all applicants to take the tests. From the results, the management will prepare short lists for interviews.

Throughout the selection and promotion procedure it is stressed by the consultant as much as by the company, that the tests are not supposed to replace traditional methods, but merely provide extra information about candidates, and help supplement personal impressions with a certain number of facts which it would be difficult to come by in any other way.

This is how Mr. Galvani, joint managing director, sees it: "The actual cost of selection per candidate by this means is considerably higher than would be a normal interview. But often it is only a matter of weeks, sometimes days, before this cost is justified. Far greater than the cost of hiring a room in a hotel is the cost of

Continued on page 123

What is an 'Overseas Trade Corporation'?

THE Finance Bill has clarified the tax relief to 'overseas trade corporations' which was announced in the Chancellor's Budget speech.

What is meant by an 'overseas trade corporation'? It is a company resident in the U.K., which is:

- 1—Carrying on a trade wholly outside the United Kingdom; or
- 2—Not itself carrying on a trade in the United Kingdom, but having subsidiary companies, each of which is an 'overseas trading corporation'.

If a parent company, for instance, has two subsidiary companies, one of which is not an 'overseas trading corporation', the parent company would not be treated as an overseas trading corporation. Nor apparently would it be if it were trading on its own account, although, presumably, if the parent company's trading activities were all abroad, the parent would rank in its own right as an overseas trade corporation.

In brief, therefore, the Bill provides that all the trading shall be done abroad, and makes it quite clear that trading abroad begins at the point when goods are delivered on board the aircraft or ship in which the goods are exported, with all charges borne by the exporter up to that point.

If any charges such as insurance commission and incidental delivery charges, or those incurred in providing any services in connection with the goods while they are in the U.K., are borne by the purchasing company and not by the seller, the purchasing company will not be an overseas trade corporation.

Certain types of business will disqualify companies from becoming overseas trade corporations. These are: Banking; lending money or

providing credit for hire-purchase business; dealing in securities; insurance; shipping or air transport; chartering shipping or aircraft; professions; royalties or payments in respect of copyright.

No company carrying on a trade in the Republic of Ireland is eligible as an overseas trade corporation.

Provision is made for an annual review of companies which have claimed to be treated as overseas trade corporations. New companies, companies wound up, or companies which become (or cease to be) resident in the U.K. can, if they possess the necessary qualifications, qualify as overseas trade corporations for the relevant part of the year.

The net effect from an income tax point of view, is that an overseas trade corporation is, subject to certain safeguards, exempt from United Kingdom income tax and profits tax on its trading profits but not on its investment income. Only when dividends are paid out does it have to bear United Kingdom taxes, although loans to directors and associated concerns are treated in the same way as dividends.

Tax-free Ideas

IN certain circumstances, awards to employees whose suggestions are adopted by the management are allowable for income tax purposes as a trading expense of the employer, and are not charged to tax in the hands of the employee.

The scheme should broadly provide for small cash or voucher awards for all suggestions adopted by the management. At the end of the year all suggestions adopted should be reviewed, and prizes, which may be substantial in amount, (say, 1st prize £100, 2nd £50 and 3rd £25) can

be awarded to the three best suggestions received. The adjudicating panel should preferably be composed of works and management representatives.

It is advisable to have a simple, easily understood scheme drawn up, and to get it approved by your Inspector of Taxes before you actually adopt it.

Before You Sign . . .

A recent income tax case which went to the House of Lords decided that a timber merchant who entered into contracts to buy and cut growing timber as specified therein—no time limit being set—had acquired an enduring right to cut timber and not stock in trade, and that the expenditure was capital and not allowable as a deduction in arriving at the profits.

This case emphasizes the importance of specifying exactly what is being purchased, and also the necessity of taking expert professional advice on the taxation position before entering into any major contract.

Sale of Know-how

ANOTHER case which illustrates the many pitfalls into which taxpayers may fall was recently heard by the Court of Appeal and may be going to the House of Lords. It concerned the sale of 'know-how'—secret formulae and processes—and of certain services. The 'know-how' was held to be the sale of an asset and not taxable, but the amount received for the provision of the services was held to be a trading receipt.

The point is that the sale price was a lump sum, and that the Court had to send the case back to the special commissioners to split the sale price between the 'services' and the 'know-how', whereas the agreement for sale could have specified the respective points of each item. If more than one distinguishable item is being sold, expert advice on the taxation implications must be obtained before any contract is signed.

Managing director John Hayward pilots his own 'plane in order to give a 48-hour on-the-spot technical consultancy service to all his Continental customers. Taking customers and their families up for flips in the aircraft also helps build friendly relationships.



Commando Tactics Captured Export Sales

By JOHN A. ASH

Polythene Ltd., processors and exporters of commercial grades of polythene, have only one salesman: managing director John Hayward. A really personal approach, linked with some novel methods and a 48-hour airborne consultancy service to anywhere on the Continent, has in six years enabled the company to establish markets all over Europe

WHEN in Rome, do as the Romans do. Don't take British habits and a conservative sales approach to your export markets." This is one of the maxims which has helped Polythene Ltd. to establish prosperous markets in all European countries west of the Iron Curtain.

Polythene Ltd. are a relatively small firm in a large industry, but they have big ideas. The main source of their ideas is their managing direc-

tor, John Hayward. This is a sales story—and Mr. Hayward is the company's sole salesman. Consequently it is very much Mr. Hayward's story.

He founded the firm six years ago. As the name implies, their product is polythene which they obtain in non-commercial form and process into standard commercial grades. Present capacity is from 2,500 to 3,000 tons a year, *all of which is exported.*

The company's marketing set-up,

as such, is non-existent. They do not believe in agents, but prefer to go straight to the consumer. With raw materials, this in itself is not unusual. It is the field tactics of Polythene Ltd. which make the difference.

John Hayward started his career as a regular soldier with the Commandos. After collecting several bullets in the Middle East campaign, he was discharged in 1942 and decided that his future lay in the plastics industry. He worked on the shop floor with plastic moulding and injection machines, and worked his way up to works manager in charge of an injection machine development project.

Then a diversion due to ill health—selling gravestones to farmers in the Fen District. On his own admission, he "learned the art of diplomacy and has been a 'Smoothy' ever since."

Next came a job with a firm of plastics importers and exporters where he learned the commercial side of the business.

Subsequently he earned himself a small fortune in commission by

selling plastics on a 'penny-a-pound-sold' basis. It was with this sum (£10,000, believe it or not) that he founded Polythene Ltd.

At that time, Mr. Hayward says, he was swayed by the Government's appeal to export more. "I liked travelling anyway, so I thought I could do my country and myself a bit of good. I decided to do nothing but export."

He feels that, to a certain extent, academic qualifications are of little use to salesmen of products such as polythene. When entering the field, he noted carefully that many of his potential competitors' salesmen fell into the academic category. In theory they were excellent—but few could take off their jackets and show a customer how to use the materials. Therefore he decided to base his own sales policy on one-man Commando tactics which would take the sales battle into his prospects' camps.

In previous jobs he had made several useful contacts on the Continent. He had also stored away a comprehensive knowledge of Continental markets. He says: "You cannot sell to a market until you know it inside out. It is necessary to know the various countries' commercial set-ups, their financing systems and their marketing methods. You must know what you are up against."

Mr. Hayward was not at all keen on agents. He feels that money spent on agents' commissions would be better spent on a salesman's travelling expenses. So to start with, he went straight to the largest firm of moulders in each country, quoting the lowest possible prices, depending on a large turnover to offset the smaller profit margin.

He started to ship polythene to his first customers. Soon he began to recognize the strength of American competition. To compete on price, Polythene Ltd. had to concentrate on marginal savings. First came

packaging. At the start, the company were shipping the polythene in five-ply paper bags, with a 'washed and repaired' hessian outer. Subsequent tests proved that three-ply bags (with the inner ply polythene-coated) with unwashed and unrepaired Hessians were adequate. The original cost of packaging was 1½d. per pound of material; now it is ½d.—a saving of more than 50 per cent.

More Savings

An airline official told Mr. Hayward that many firms waste pounds by over-careful packing for air transport. As a test, the company sent some material samples to Australia, wrapped only in a transparent polythene bag sealed with an elastic band round the neck and with an ordinary case label. They reached their destination unscathed, and the 'packing' was returned by ordinary letter mail for 3½d. With air freight, an extra half kilo can cost an extra 16s., so this was quite a consideration. And as the polythene bags were transparent and sealed with an elastic band, there could be no question of re-sealing fees after Customs inspection. Needless to say, Polythene Ltd. now send all their smaller samples this way.

Mr. Hayward also decided to make some savings on the actual loading of polythene on to ships. He had the material 'barged out' where possible—a cheaper proposition than dockside handling, which as many exporters know to their cost, is not always of the highest standard.

He realized that it was on fractional savings of this sort that survival might depend if the market got really tough.

Having established one main customer in each country at a concession price, Mr. Hayward had plenty of excuses for visiting the Continent. On each visit to a customer, he took

the opportunity to visit the local chambers of commerce to obtain lists of all plastic moulders in the country concerned. From his previous knowledge of the markets, he was able to sort the wheat from the chaff—then go harvesting on subsequent visits. New, smaller customers were charged at the normal market price, thus enabling Polythene Ltd. to start making larger profits. Then in some cases, the first large customer was cut out, or had his prices put up to match.

As his market widened, more and more Continental firms got to hear of the Englishman who gave a comprehensive personal sales service and (possibly out of sheer disbelief that such a phenomenon existed) hastened to contact him. Mr. Hayward began to make friends with his customers. At that time more than 80 per cent of the orders were made by word of mouth. His personal approach was backed up by the factory in England, and delivery promises were never broken. The goodwill *this* created was enormous.

As the number of customers increased, the problem of giving a personal service grew. So ex-commando Hayward bought a light aircraft, took flying lessons and obtained his flying licence.

The aircraft, which is hangared at Denham, helped to put into force another sales belief. Mr. Hayward says that British manufacturers should remember that they are 3,500 miles nearer to the Continental market than the U.S.A., and if they cannot take advantage of that fact, then they don't deserve to be in the export business. By using the aircraft, Polythene Ltd. give a 48-hour on-the-spot consultancy service to all customers in Europe.

The aircraft is an Auster, and, Mr. Hayward says, "it can land on a sixpence." He makes no secret of the fact that he makes emergency unauthorized landings (for technical reasons of course) in fields or other open spaces which happen to be near the factory he is visiting. Naturally the 'promotional' value of landing on a customer's doorstep is quite considerable.

Polythene Ltd. have steadfastly refused to go only to the market paying the highest prices. Half the production goes regularly to less rewarding markets, to prepare for the time when they boom

"I should say the cost of running the Auster is comparable to running a 12 h.p. car," says Mr. Hayward. The plane, second-hand with a three-year C. of A., cost £350. Hangarage costs £1 per week; maintenance, running repairs and official inspections about £50 a year. The landing fee at airports (when he uses them) is about 5s. Fuel consumption is about three and a half gallons an hour at 95 m.p.h., and fuel in this country costs about the same per gallon as ordinary car petrol, while overseas it is duty-free.

A successful method used by Polythene Ltd., to capture new custom is based on simple psychology, confidence in the product, and an element of surprise. When a company write to Polythene Ltd., explaining their problem and asking for a 1cwt-sample of polythene, three steps are taken:

- 1—The company's technical staff consider the problem, and decide whether their material is suitable for the job. If it is . . .
- 2—Half a ton of polythene is despatched (import restrictions permitting).
- 3—A letter is sent to the firm saying "We are sure our polythene is the material for the job. Make as many tests as you like with the half-ton which is on the way to you and don't pay for it until you are completely satisfied. If you cannot use it, our managing director will call on you personally at 48-hours' notice, and investigate the problem. If he too is unsuccessful, we will take the material back, and you won't have to pay a penny."

The approach has yet to fail and a large number of Polythene Ltd.'s existing customers were obtained in this way. Subsequent flying visits by Mr. Hayward strengthen the personal bonds between customer and supplier, and as a rule the customer does not hesitate to recommend Polythene Ltd. to his friends.

Similar treatment is given to existing customers. When they ask for advice on moulding, say, a bucket, Mr. Hayward flies out, inspects the job and the machinery, and gives his

opinion. The polythene is despatched on the understanding that if the customer has any difficulties at all with the job, then Polythene Ltd. will either send out a representative to show them how to do it or, if he fails, take the material back at no charge to the customer.

This policy is pursued in all countries. Mr. Hayward says: "On my trips to see customers, I don't 'push'

Six-point Export Plan

- 1 Give concession prices to one big customer in order to get a foot in the door.
- 2 Give a comprehensive consultancy service on customers' doorsteps at short notice—and don't break delivery promises.
- 3 Don't force your own product on your customers all the time—give them the benefit of your knowledge of the market as a whole.
- 4 Don't be frightened to recommend the most suitable material for the job, whether you make it or not. It may pay in the long run.
- 5 Make friends with your customers—friendships don't fall apart so easily as contracts can.
- 6 Above all, don't regard overseas visits as expense-account sprees. Remember that you're there to SELL.

the product at all costs. I try to give them an overall picture of the plastic moulding market and trends and developments outside their own country."

Where Polythene Ltd., score over some of their competitors is the fact that they will recommend the most suitable material—whether it is made by them or not. This is a long-term policy, for the firm know that these near-customers will not forget the help given, and when they have a job to which Polythene Ltd.'s material is suited, they will almost certainly call them in again.

Polythene Ltd.'s technical consultancy service may seem excessive in

relation to their present volume of sales. But obviously it pays, for in seven years, the annual turnover has increased from £20,000 to nearly half a million pounds. And within 18 months, because of the increasing availability of raw materials, the company hope to double this figure.

Polythene Ltd., have not placed all their eggs in one basket. A policy which they adhere to rigidly is that 50 per cent of production goes to the best available market, and the remainder is shared between all other markets. They have steadfastly refused to go only to the market paying the highest prices. Half the production goes regularly to less rewarding markets, to prepare for the time when they boom.

A great deal of goodwill has been created by the use of the aircraft. When business is finished, Mr. Hayward normally volunteers to take the customer and his family up for a flip. Thus the foundations of a personal friendship are laid. Now, Mr. Hayward rarely has to stay at a hotel during his Continental visits: usually the customer welcomes him as a guest.

Polythene Ltd., have succeeded where others have failed because they recognize the reasons behind the post-war sellers' slump, and have bothered to do something about them. Says Mr. Hayward: "Today, good salesmen are scarce. They do not know their markets, their customers or their products half well enough. And their companies don't help things much because of their apathetic attitude towards after-sales service.

"And another thing. Selling abroad has become too much of an endless round of pleasure and expense account bashing. Salesmen seem to put their own pleasure first and sales second—partly because of the high rate of surtax which is killing incentive. This country will never fully recover its pre-war prestige unless companies completely re-think their export sales policies and really get to know their markets. And to do that one must go there and meet people and make friends with them—businesswise!"

END

SELLING POINTS

Say It Out Loud

● Gramophone records made of specially treated paper have been around for quite some time, but until recently they were seldom exploited for more than the occasional novelty greetings card, or for children's books.

Now an American company has introduced *Auravision* as a sales promotion medium. It can reproduce recorded music or speech on specially treated printed surfaces of almost any size or shape—postcards, brochures, insets, etc.

Another company has marketed the *Olmsted* paper-backed record, and also produces little plastic records which can be mailed or inserted in sales literature.

Incidentally, there is another 'sound' medium for sales talk. American travellers can now buy—for a modest £28—a talking klaxon for their cars. When the horn ring is pressed, a five-second sales talk is broadcast from a tape recorder concealed under the driving seat.

Sponges Thrown In

● Trico-Folberth Ltd., are using the old chain-letter idea to push sales of their motor accessories. Recent advertisements in the motoring Press invited readers to send in for a little gadget which makes parking in a confined space easier.

Recipients get with it a form on which they are invited to put down names and addresses of two friends who would also like to receive the parking aid. Of course, the two friends in turn also receive forms asking for two further addresses from each. If Trico receive both forms back, duly completed, the original

applicant is presented with a free car-washing sponge.

This is not the first of such sales gimmicks to come from Trico (see *BUSINESS*, November 1956, page 105).

Indirect Mail

● An expert has written to *Advertiser's Weekly* to attack Sir Miles Thomas for recently affirming that there is no wastage with direct mail shots.

Years of experience, he says, have shown that between 30 and 35 per cent changeover can be expected on addressing lists every year. Thus, accurate mailing means intensive (and expensive) revision of addresses the whole time. He goes on to tell this dismal story:

A short time ago, his firm sent a questionnaire to 1,000 manufacturers of hardware. Among the questions was one which asked whether the recipient recalled ever having had a letter from the senders before. In actual fact every single one had had four personally addressed letters sent to him the previous year. This did not prevent 96 per cent answering with a point-blank: No.

Cereal Story

● Here is how *not* to capture the juvenile market. Advertisements for a prominent breakfast food recently featured an illustration of a Grand Prix motor race in progress. There were also line drawings of model cars and the ad promised: "A free model racing car in every packet . . . just like the real thing . . ."

One Edinburgh father, who is also an advertising agent, reports that his son saw the advertisement and began a dogged campaign to change over to this breakfast food. When the packet eventually arrived, the youngster found that the "lovely surprise for your children" was, in fact, a two-inch piece of moulded plastic. Result: one household into which that breakfast food will never again penetrate.

No Foot in the Door

● America's Fuller Brush Co. are legendary for their travelling salesmen. But foot-in-the-door tactics are

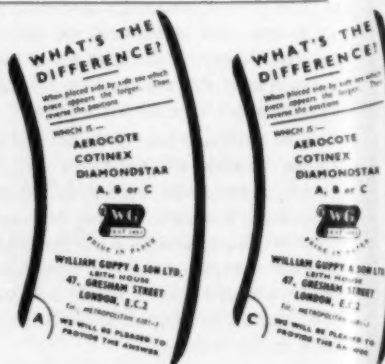
frowned on these days. Here is the modern routine:

The salesman rings the bell and hands over—with compliments of the company—a small 'premium' gift, together with a copy of a glossy woman's magazine. Then he leaves again, saying he will be back the following day to pick up the journal. No sales message whatsoever.

Mrs. Housewife's curiosity is attracted by the magazine's lush cover, promising a feature entitled: 'My Husband has Seven Wives'. Lured by this, she leafs through the book and finds herself exposed to the complete Fuller catalogue—interspersed the whole way with the attention-getting feature. Next day, when the salesman calls to retrieve his journal, a good deal of his selling has already been done for him.

The Fuller magazine is not always produced to the same formula. Previous issues have contained 'getting married' material, do-it-yourself features and model fashions. Issues are about 40 pages in size, and the print order is about 20 million. Cost per copy works out at roughly 8½ cents but this is largely covered by what the dealer-salesmen pay the company for them.

Result? The company find that little other advertising expenditure is needed, so strong is the magazine's pull. And salesmen happily report that it boosts sales while reducing the time spent on each call.

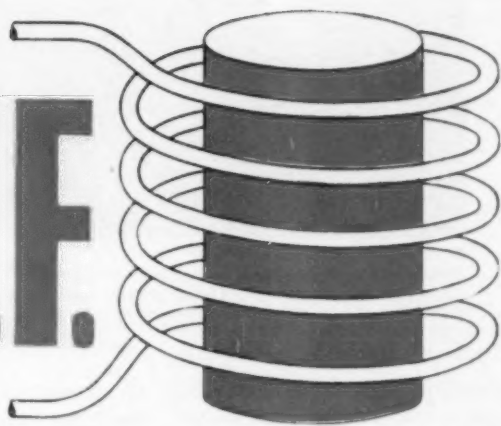


TEASER—Ever-fascinating is this optical illusion. William Guppy and Son Ltd., London paper merchants, used it as an attention-getting gimmick in a recent circular letter to customers

BUSINESS



R.F.



HEAT ON TAP

- PUTS CRAFTSMEN'S JOBS ON MASS-PRODUCTION BASIS
- MAKES POSSIBLE NEW FABRICATION METHODS

RADIO frequency power is finding a bewildering variety of applications throughout industry. Every day sees an increase in the number of units in use and some executives have difficulty in keeping up-to-date with what R.F. can or cannot do.

Yet the criteria are simple. Where heat has to be applied to a material quickly, cleanly and 'accurately', the chances are that R.F. can do it better than anything else.

Early post-war reports that R.F. could cook the Sunday joint in a few minutes were quite correct—but an electronic oven would be very expensive and the meals would probably be tasteless. On the other hand, R.F. has taken the majority of metal hardening jobs out of the hands of craftsmen; cheapened the large-scale

production of glued wood products like furniture and doors; put awkward, specialized brazing and soldering processes on to an automatic production line basis. It is by far the commonest method of joining or welding most plastics; is replacing hand sewing in upholstery for cars,

By WILLIAM GUTHRIE

buses and aircraft; and seems certain to replace it in domestic upholstery.

The value of R.F. heating lies in its ability to apply heat exactly where it is wanted, at exactly the right temperature and at the exact moment it is required. The heating cycle can be automatically controlled, so that perfect conditions can be repeated at will, ensuring a consistent product and eliminating rejects.

But the applications have to be chosen carefully. The capital cost of an R.F. installation can be from £100 to £10,000 and more, excluding handling apparatus, and power consumption is often considerable. But R.F. has the advantage that it takes the heat straight to the work, even through a thick container, without the need to heat the container, or even to touch it—in fact, the heat is generated in the work itself. In some cases, the best of both worlds can be obtained by using R.F. heating in conjunction with conventional heating.

For industrial use, R.F. heating offers four main advantages:

- 1—It enables tasks which used to require hours of skilled labour to be done in a few minutes by a girl with a generator, ancillary handling equipment and an automatic process-timer. That is why R.F. is often part of a production line.
- 2—It vastly increases the productivity of a given factory space or labour force, as, for instance, in gluing wood and paper, and joining upholstery.
- 3—Often it is the only possible method of heating, because high temperature can be concentrated in the right spot, without damaging adjacent material.
- 4—It makes practicable the use of less expensive equipment—such as simpler presses for plastic and rubber moulding, or for forming wood laminations into complex shapes.

Often R.F. heating, if its speed and convenience are to be exploited, demands special mechanical handling equipment. In extreme cases this can be as expensive as the generator itself, but it may increase productivity out of all proportion to the cost. Often, too, the vast productivity increase made possible by R.F. means that the whole process has to be rethought, and this has to be reflected

in the design of the handling equipment.

R.F. power has been applied in industry on a large scale only since 1945. Early models were used before 1939 to 'de-gas' electrodes of valves, increasing their efficiency. The equipment used was 'home-made' and massive: nowadays valve manufacturers buy compact generators from specialist firms, of whom there are about a dozen in this country.

The power used in all R.F. applications is exactly the same as that used in broadcasting transmitters, except that it does not have to be 'refined.' It is usually generated in the same way—by high-power valves. The amount of power generated is sometimes comparable with that used by the most powerful transmitters, although smaller amounts, up to 20 kw, are much more common. Very high powers—up to hundreds of kilowatts—are used in large furnaces that melt tons of metal an hour.

R.F.'s main applications fall into two main categories: induction heating and dielectric heating. Materials that conduct electricity (metals) are heated by induction; non-conducting materials are subjected to high-frequency, high voltage 'fields' which cause them to rise in temperature. The other important differences between the two methods is that induction heating concentrates initially in the 'skin' of the metal whereas dielectric heating causes temperature to rise evenly throughout the material if it is homogeneous.

The main uses of induction heating are the melting, hardening, annealing, soldering, brazing and welding of metals.

Melting. The melt is the hottest part of an R.F. furnace, in contrast to the conventional furnace, where the container is hotter. This means considerable savings in time and fuel, the easy attainment of very high temperatures, and the absence of obnoxious fumes. The crucible can be regarded merely as a container, lagged to conserve the heat, rather than as a special medium that must withstand far higher temperatures than those required for the melt.

One or two turns of copper tube,



One of the earliest applications of R.F. was for melting metals. In the cabinet on the extreme right 1½ lb. of chrome steel is melted in 17 minutes; then it is poured to make hard and durable dies for casting porcelain miniatures

shaped to surround the crucible but not necessarily to touch it, is all basically that is required to take the energy to the work. The tube itself remains cool, but it is subject to radiation from the work, so it is generally kept at a safe temperature by pumping water through it.

The theory is simple: the metal behaves in much the same way as the short-circuited windings of a transformer—it gets hot and melts. If the correct power and frequency are used, the process takes only a few minutes. Generally speaking, less metal is lost through scaling and no ash has to be removed. A powerful self-stirring action occurs, which makes alloys homogeneous throughout.

Here is an example of an application in this field.

George Wade and Son, of Burslem, Staffs., had to re-organize their meth-

ods of producing porcelain animal miniatures in order to outsell cheap Japanese products. Phosphor-bronze dies were first chosen for producing the miniatures because of the ease with which this alloy melts. The surface of the phosphor-bronze was chrome plated to lengthen its life, but the plating did not 'take' evenly over the surface. The result was that the dies sometimes lasted for only a few days.

It was then decided to cast them from chrome steel, but the problem was how to melt economically the relatively small amounts of steel (less than 5 lb.) required. Neither gas nor electric resistance type furnaces could provide the high temperatures necessary. So the firm adopted R.F. heating.

A G.E.C. 5kw. R.F. generator and furnace unit melts more than 1½ lb. of chrome steel in about 17 minutes in conditions of cleanliness normally associated with laboratories; moreover, the equipment is always ready for immediate use.

Hardening. The surface heating (or 'skin effect') of metals, when subjected to intense magnetic fields is particularly useful for hardening processes. Many engineering components, like gear wheels and the half shafts of vehicles, have to withstand severe shocks from transmission irregularities, and at the same time their wearing surfaces must be very hard. The solution is to make the

You can use R.F.

- For hardening metals
- Soldering, brazing and welding
- Wood gluing
- Welding plastics
- Joining upholstery

component of soft steel and to harden only the portions of it that are subjected to wear. In the past, this was invariably done by introducing carbon at the appropriate points and heating them with a flame. Considerable skill was required to achieve the requisite hardness without impairing the toughness of the rest of the component, and it was even more difficult to be sure that the component would not break down prematurely.

This is a job for which the R.F. 'skin effect' is particularly suitable. After trial and error, and the destructive testing of specimens, have established the power required and the duration of heating, any degree and depth of hardness can be achieved on a repetitive basis. Moreover, there is no possibility of the hardening process having undesirable effects on the rest of the component.

Invariably the generator manufacturer and the customer co-operate in the design of associated handling equipment. The simplest is a 'two-station head' which makes possible the unloading or loading of one part while another is being processed. The more complex are virtually transfer machines turning out thousands of small components, like screws, from the raw material, with R.F. hardening as only one of a sequence of operations.



For example, British Thomson-Houston Ltd. and Ransomes, Sims and Jefferies Ltd., have together developed a machine for high-speed hardening of lawn mower blades. After shaping and assembly into cylinders, the blades are taken on a slow conveyer to the hardening unit. There the cylinders move up and down past the R.F. coils and quenching jets, and each blade is progressively hardened. Considerable ingenuity in design makes only one or two adjustments necessary for handling different sizes and types of cylinder.

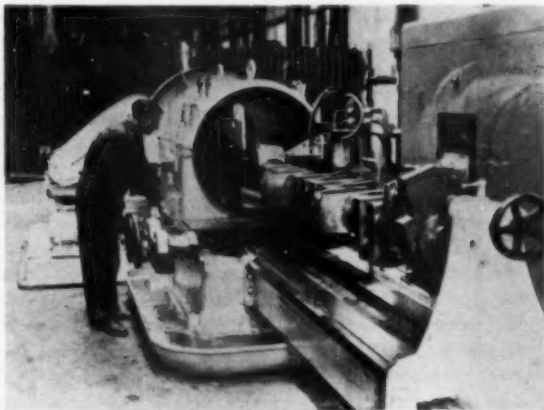
Annealing. Many steels are more readily shaped and worked, (and the product less prone to fatigue and breakdown), if they are first heated to a given temperature for a certain time and allowed to cool at a fixed rate. The same applies to stress relieving and normalizing. R.F., for the same reasons as above, safeguards the product, which has already undergone several costly operations.

Soldering, Brazing and Welding. R.F. revolutionizes any repetitive solder-

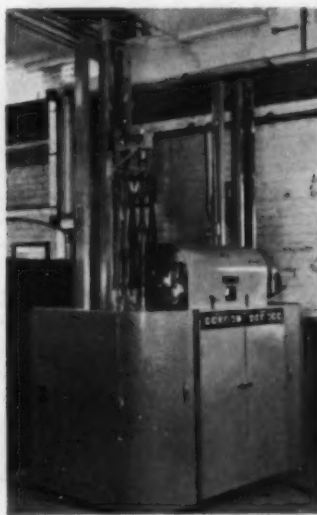
ing, brazing or welding operation where accurate jigging is possible and a constant supply of workpieces is available. Jigs are necessary to enable the electrodes to get, every time, at the most suitable position for making the join, and to enable the process to be controlled by an automatic timer. And R.F. becomes economical only when a large number of pieces have to be processed.

Where these requirements are fulfilled, one girl can do soldering, brazing and welding more cheaply, more quickly and more consistently than a dozen skilled operators using more conventional methods. Moreover, there is a considerable saving in material, which is important with silver solder. Filler rod or solder is cut beforehand to exactly the amount required; the component to be treated is jigged; and the power is switched on. When the correct temperature is reached, the power is automatically switched off. Meanwhile the pellet of solder or filler rod melts into the joint and spreads over it.

Probably more R.F. sets are used for dielectric heating applications than for induction heating, although



R.F. power hardens crankshafts weighing up to several tons to the exact degree of hardness required in very large diesel engines. The 125kw Redifon installation (above) is at the Manchester works of Mitchell Shackleton and Co. Ltd. (Right) To exploit the speed of R.F. hardening, the apparatus is generally part of a production line. Cylinders of lawn-mower blades arrive at this two-station unit on a conveyer. While one unit is heated and quenched, another is loaded





SCIENCE PROSPECT

in many instances the generators are of relatively low power.

Wood Gluing. Synthetic resins and R.F. heating have between them revolutionized the large-scale production of furniture and made possible new products, like resin-bonded chip board and strong, light laminated wood furniture of complex shapes.

Some resins 'cure' or harden with heat, changing their chemical composition and making a joint stronger in most cases than the materials on either side of it. The hardening of animal glues can take days at room temperature, or hours with steam presses—but with R.F. heating, resins harden in minutes or even seconds.

A furniture factory using R.F. and resin has, man for man and space for space, a much higher productive capacity than one using animal glue. Its floor area is clear of work in jigs and clamps, the presses are lighter and cheaper, while the additional conveyer system is not very expensive. Small pieces of wood, normally wasted, can be joined end to end and side to side, to make long strips or broad panels, which will break anywhere but at the joint.

The three methods of R.F. curing—glue-line heating, through heating and stray field heating—make use of the fact that the resin, having a loss factor different from that of the wood 'absorbs' most of the power, and hardens. They have different applications and jig requirements.

Glue-line heating is used whenever possible because it is the most efficient. Jigs have to be carefully made to ensure that the electrodes are in the best position, but once operators learn the basic principles they become very skilful. It is used for veneer splicing and the joining of edges.

Through heating is the oldest and perhaps commonest method because it is so flexible and the jig requirements are very simple. It is used chiefly in the manufacture of plywood and in the shaping of laminations for 'contemporary style' furniture.



Because R.F. localizes heat it avoids damage to adjacent parts. Conventional soldering caused 10 per cent rejects on these spindles and hubs, due to annealing. Now R.F. multiplies output 12 times, saves solder, and eliminates rejects

Stray-field heating, though not as efficient as the glue-line method is convenient, flexible, and growing in use. Platens containing electrodes in the form of a grid replace the normal jigs, and any reasonably flat assembly equal in size to the platens, or smaller, can be treated. It is specially useful for attaching mounting blocks to the insides of radio and television cabinets and pieces like shelf bearers to the ends of wardrobes and chests. In cabinet assembly stray-field heating saves the use of many clamps, and eliminates nails and the filling of nail-holes.

Higher Output

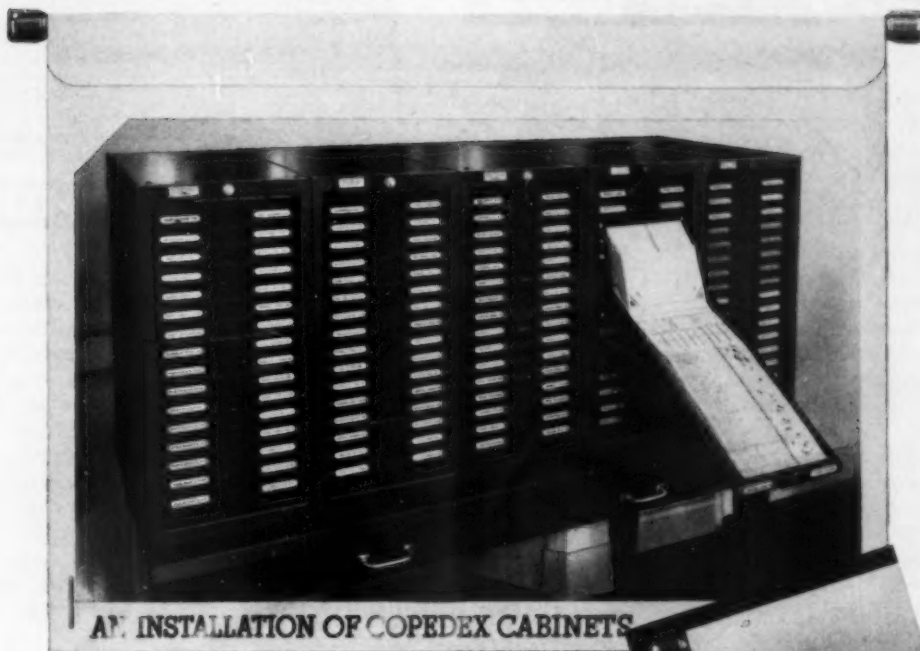
Curved and complex shapes were formerly made from laminations in multi-daylight presses—tiers of steam-heated platens exerting extreme pressure on the veneers. Apart from their high cost, these presses handled only a limited amount of work per day and their loading and unloading took some time. Now laminations are formed in minutes using less pressure in simple presses with one pair of platens. Resin be-

tween the laminations is cured by through-heating with R.F. Loading and unloading are easy, and productivity is many times higher. Structures combining immense strength with light weight are easily made, like the side pillars supporting the roofs of railway carriages.

The large-scale production of resin-bonded chipboard is made possible by synthetic resins and R.F. It was quoted as an excellent example of automation in the recent report by the Department of Scientific and Industrial Research. The process, from the feeding in of the wood waste to the production of continuous hard dry board, is practically automatic. Using R.F. power totalling 90kw, a sheet 4ft. wide is produced at the rate of between two and three tons per hour.

Plastic Pre-heating. When plastics are moulded in a press, output is governed by the rate at which the material can be heated before moulding. In order to maintain maximum output from a press, it is therefore essential to pre-heat the plastic, in pellet or powder form, in an R.F. oven. Other methods have been tried, but only R.F. can heat the pellets with the required speed to exactly the right temperature without causing curing, which should not occur until the plastic is in the mould.

A survey by Radio Heaters Ltd., Wokingham, showed various benefits of plastic pre-heating by R.F. One of their customers, the Turner Manufacturing Co. find that by pre-heating plastic powder by R.F. the thrust required to produce a toilet seat is reduced from 350 to 125 tons. The firm put the thrust of the press to use by increasing the platen area, enabling them to undertake larger and heavier pressings. Another firm, Moulded Products Ltd., Birmingham have doubled their output of plastic radio cabinets in phenol. Due to the better flow of the plastic powder, finish is greatly improved and the force required is reduced from 750 to 400 tons. Output of teapot handles is up by 150 per cent and scrap is reduced from seven to one per cent. A third firm, S. Smith and



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SCIENCE PROSPECT

Sons (England) Ltd., report a considerable reduction in breakages of the pins which form fixing bushes in mouldings for electric clocks.

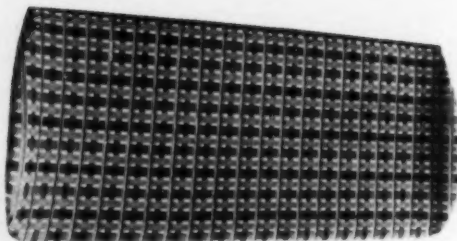
Plastics Welding. The welding, embossing and forming of plastic garments and fancy goods is almost exclusively the province of R.F., which has made their mass-production possible.

The thin sheets used in their manufacture can be heated and welded very quickly. The old method of using electrically or steam-heated pressure plates often caused the outside layer to decompose, due to excess heat, while the other layers were not properly bonded. This trouble is eliminated with R.F. heating.

Early R.F. welding machines were simple affairs with nothing but electrodes and they did nothing but weld seams. Modern equipment is much more versatile. One machine, for instance, will weld a belt out of several layers, with edges seamed and finished, and punch five buckle holes, while the metal buckle itself can be coated with a skin of matching p.v.c.

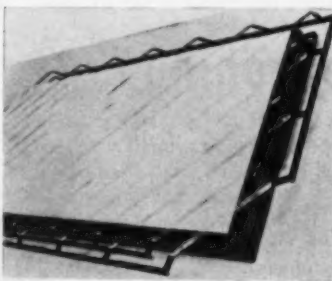
The upholstery industry has not yet felt the full impact of the plastic revolution. But plastic upholstery

The speed of plastics welding by R.F. has revolutionized car upholstery and promises to do the same in the domestic field. This padded bed head is welded by a Radio Heaters unit to a panel and embossed in one operation

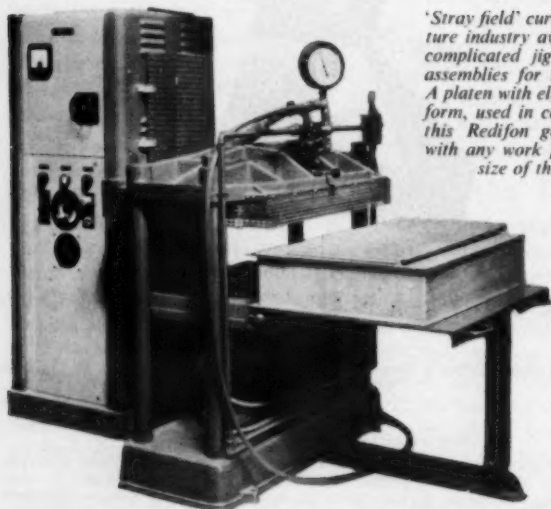


is already used extensively by the car industry. Here R.F. welding replaces a great deal of expensive hand and machine stitching, and it bonds 'trims' to panels cleanly and strongly.

Many people still prefer cloth upholstery to the 'cold' feel and appearance of plastic. But it seems as though R.F. may end the need for stitching this too. By coating the edges of the cloth with a plastic composition it can be joined to another cloth or even to a different type of material in a matter of seconds.



'Stray field' curing in the furniture industry avoids the use of complicated jig and electrode assemblies for individual jobs. A platen with electrodes in grid form, used in conjunction with this Redifon generator, deals with any work piece up to the size of the platen



R.F. dielectric heating has also entered the food processing field. One manufacturer of starch-reduced rolls had trouble with partially cooked dough occurring in some of the rolls. These took two days to dry even in an air-conditioned room, probably because the crust was crisp and impermeable. A conveyerized R.F. drying oven cures the trouble in 30 seconds.

Among the non-food uses of such ovens are the drying of tobacco, sponge rubber, and certain woods; and the pre-heating of cork chips before use in the manufacture of linoleum.

The decisive factors in adopting dielectric heating or drying are whether it gives a higher quality product or fewer rejects in mass production, and whether conventional methods are inefficient. That is why, in the textile industry, yarns which can be spread out are dried easily and cheaply by steam pipes; but bobbins which formerly took days to dry, are now ready for use after half an hour's R.F. treatment.

There are great possibilities in combining R.F. heating with ordinary methods. A firm manufacturing baking ovens is co-operating with R.F. specialists in building ovens which cut the time for producing biscuits from nine to two minutes and improve the biscuit. One oven is in production at Liverpool and more are being installed. A very large installation has been ordered from Holland.

In these ovens by far the greater volume of heat is produced by conventional means. But R.F. is used primarily for its ability to generate heat in the internal layers, cooking them quickly and evenly. END

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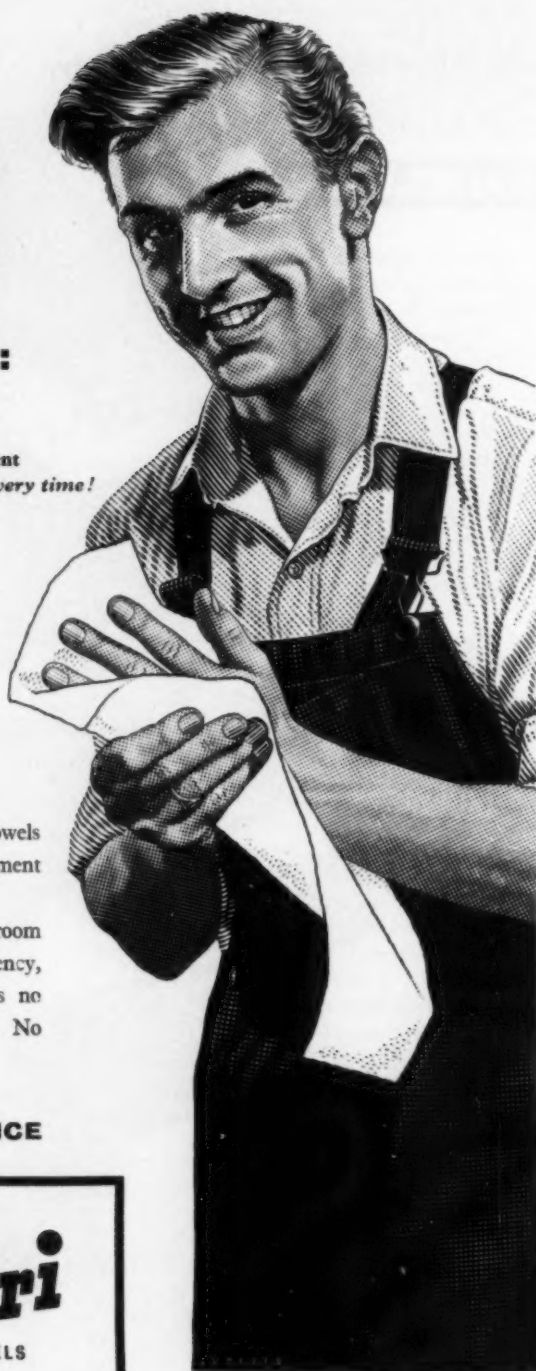
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Many incentive schemes fail to achieve the desired results because it is not realized what far-reaching effects their introduction will have on the organization as a whole, or how their success is utterly dependent on the reaction of the employees.

Unlike other techniques used for increasing productivity (work study, for example), an incentive scheme has no independent existence. It is basically little more than a working arrangement between employer and employee concerning the amount of money to be paid for work done over and above a certain level. Consequently the mechanics of an incentive scheme are of minor importance compared with the appeal it makes to the employees, and to the way it is 'put over' by the management.

Because incentive schemes affect employees in the most vulnerable spot—the pay packet—their attitude towards such schemes is fiercely critical. However perfect the scheme may be in theory, the employees will judge it solely from the viewpoint of whether it enables them to earn what they consider to be a reasonable reward for extra work. If it appears to act unfairly in any way, it will almost certainly be rejected out of hand.

Misunderstandings can easily arise which will seriously jeopardize the success of a scheme even before it has been put into operation. In one firm a scheme had only just begun to operate when several employees expressed quite unfounded fears that they were to be 'speeded up' and that any failure on their part to reach the required output targets would result in instant dismissal.

The main reason for this misunderstanding was that, as often happens, the rates set appeared high in comparison with existing output figures. Consequently the employees thought it would be very difficult to earn bonus, and enquired from their supervisors what would happen if they were in fact unable to reach the targets.

Although the mechanics of the scheme had been fully explained to the supervisors, it had not been impressed upon them that any queries

Why Some Incentive Schemes Fail

A bonus scheme is not a panacea. Unless local conditions are studied carefully—and the mechanics of the scheme are explained in the right way—it is more likely to create new problems than to remove existing ones. Here a consultant gives some anonymous case-histories which pinpoint the causes of many unexpected failures.

relating to it should be answered very carefully, particularly in the early stages.

As a result, the supervisors (who were completely 'sold' on the idea of the scheme and, if anything, over-

By WALTER BENTON

anxious for its success) had intimated that anyone failing to earn a good bonus had better watch out! This statement confirmed the employees' original doubts.

To correct this wrong impression,

a senior member of the management had a personal talk with each employee, pointing out that the scheme was designed to operate as much for the employees' benefit as for that of the firm, and stating categorically that it did not carry any threat to their security.

Demonstrations were then arranged, in which the employees played an active part, to show that individually each employee was easily capable of attaining the required output. It was also pointed out that when a job was done in less time than the standard, the operator received the whole benefit of the saving.

The employees were eventually persuaded to give the scheme a trial, and in a comparatively short time they were regularly earning a handsome bonus. Consequently they became enthusiastic supporters, not only of the scheme in their own factory, but of incentive schemes in general.

A frequent cause of failure is either that the management have not taken sufficient trouble to ensure that the details of the scheme have been fully explained, or that the explanations have been given in technical language which conveys very little to the average employee.

One case-history of this type is taken from a factory where the department concerned was staffed entirely by middle-aged married women. As these women came out to work mainly because the money they earned made a vital contribution to the family income, it was confidently expected by the management that their response to a new incentive scheme would be above average.

In fact the department showed the worst performance of any in the factory. After two months the average bonus earned was only 3 per cent, and many of the women were not making any bonus at all.

The management tried to overcome the antipathy which the women exhibited towards the scheme by introducing daily bonus records and production targets, so that each woman knew what her bonus earnings had been for the previous day, and how the performance of the department as a whole compared with

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A frequent cause of failure is that either the management have taken insufficient trouble to explain the details of the scheme, or that the explanations have been given in technical language which conveys very little to the average employee

set targets. But the position did not improve. In fact the overall output of the department dropped below the average level maintained before the scheme was introduced. Eventually the management called in a consultant to investigate the situation.

In due course the consultant discovered that although a member of the management had explained to the employees in each department exactly how the scheme worked, his explanation had been couched in rather technical terms which the women in this particular department had failed to understand.

They had been told, for example, that bonus would be calculated as a percentage of time saved, so that if eight hours' work was completed in seven hours, this represented a 14 per cent bonus. It had also been explained that bonus would be calculated on the *average* results for the week, and that the effect of a high output on one day could be offset by a low output the following day.

Another point which had been stressed was that if improved methods were introduced it might become necessary to raise the existing standards, as otherwise bonus earnings would be excessive.

What They Thought

Finally the employees had been told that the scheme had been introduced because it was vitally necessary to increase the general level of productivity, and that the management wanted to see a greater individual effort by everybody in the factory.

As a result of this explanation the women had formed their own far-from-complimentary opinions about the scheme. Here are a few examples.

"The scheme is a swindle, because if you earn bonus today, but do not

make any tomorrow, you lose what you have already made."

"It's no use going by the targets which have been set, because as soon as you start earning a good bonus the targets will be raised."

"The whole scheme has only been introduced because the management do not think we are working hard enough."

"You can't earn enough bonus to make it worth working for."

"There has been nothing but trouble since the scheme started, and the sooner we are left alone to get on with our work in the old way, the better!"

New Approach

Had the management known that the women held these views they could have corrected the wrong impressions, instead of concentrating on the purely technical aspect of the problem. But, as often happens, the women had been unwilling—or unable—to communicate their feelings, with the result that a barrier of misunderstanding had formed.

As a first step towards removing this barrier, the consultant adopted an attitude in which he apparently dismissed the whole incentive scheme as a matter of little importance. He made it quite clear that, as far as he was concerned, it did not matter whether the operators earned bonus or not. In this way he counterbalanced the over-emphasis which had been placed on the scheme, and helped the operators to see the whole situation in a better perspective.

Once the employees had been restored to a more contented frame of mind, the consultant re-introduced the subject of the incentive scheme, using terms which were easily understood, and illustrating, by means of

simple examples, how the scheme affected each woman personally.

Dealing with the vexed question of average bonus earnings, he made a point which had unfortunately been missed in the original explanation. This was that a woman's output would have to fall *below* the standard rate for the job before she actually lost any of the bonus she had earned the previous day; and that even if a good day was followed by a succession of mediocre days, the cash bonus earned would still increase, although not of course very rapidly.

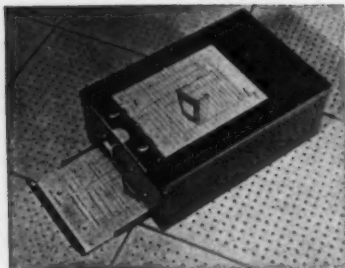
To make it quite clear how much a woman could earn if she set her mind to it, the consultant went on to explain bonus calculations in terms of money instead of percentages. He pointed out that every five minutes saved on a job was worth roughly threepence, so that, if at the end of the day they had done eight hours' work in seven hours (to use the original example) they were approximately three shillings better off than they would have been without the incentive.

As they ought to be able to earn at least fifteen shillings to a pound a week, by the end of the year their wages would have increased by £40 or £50, and this sum would make a substantial addition to the family budget.

Fears Allayed

He also explained that an incentive scheme was a good way of encouraging employees to increase output and at the same time to reward them according to their individual efforts. It was most unlikely, he emphasized, that higher standards would be introduced unless the management themselves made drastic alterations in work methods.

In this way the majority of women

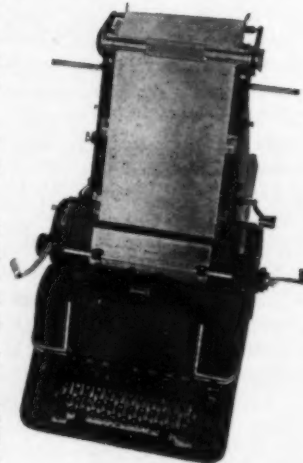


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OLYMPIA - LONDON

17th—27th JUNE, 1957

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in the department were persuaded to 'have a go'. Their efforts soon began to show satisfactory results, and in a few weeks' time the average level of bonus earnings in the department had risen to 18 per cent. Eventually the department as a whole became, as the management had originally anticipated, one of the star performers in the factory.

Another reason why incentive schemes fail is that some managements tend to regard them as a panacea. Incentives are applied wholesale irrespective of whether conditions in each case are suitable. A scheme was introduced in factory A, it is reasoned, and output rose by 20 per cent. Factory B appears to be similar. Therefore an incentive scheme in factory B will meet with equal success.

Weak Management

This attitude completely ignores the many fundamental differences which may exist between factory A and factory B; differences which are none the less important because they may not be immediately apparent, even to the trained observer. Unless local conditions are considered carefully, the scheme is more likely to cause difficulties than to remove them.

This is what happened in a factory where the management was extremely weak, and the organization and control virtually non-existent. Despite advice to the contrary, the managing director was convinced that an incentive scheme would supply the answer to his problems, and would in fact take the place of managerial control.

A consultant was employed to install the scheme, but he soon found that he was up against almost insuperable difficulties. Much of the information required to operate the

scheme was virtually unobtainable, and as the managing director would not allow him to make any alterations or improvements in existing procedures, the consultant had to make do with the scanty records that were available.

Eventually a scheme of sorts was put into operation. It was a complete failure. The operators were keen on the idea of being able to earn more money, but when they went all out to achieve the targets, the result was little short of chaos. The system of material supply, which had always been weak, broke down completely; consequently hold-ups became so numerous that output was seriously affected. Other weaknesses in the managerial structure, which had previously been hidden by the general inefficiency of the organization, were mercilessly exposed.

As the overall position deteriorated, the employees found that, however keen they might be to earn bonus, it was virtually impossible for them to do so. Eventually the scheme had to be withdrawn, and the managing director, at last convinced that there was no easy solution to his troubles, embarked on a lengthy and expensive management re-organization which, in due course, enabled him to obtain the results he required.

This is only one example of how the misuse of an incentive scheme can lead to failure. Similar situations are continually arising when incentives are used, not for their real purpose—which is to increase productivity—but to bolster up weaknesses in the organization and management, a purpose for which they are completely unsuited.

Lack of Confidence

Employees soon lose confidence in an incentive scheme if they have any

reason to think it is operating unfairly.


In one firm it was decided to introduce a scheme in which the bonus earned would be calculated as a percentage of each employee's hourly rate. This meant that if two employees, one being paid 4s. an hour, and the other 5s. an hour, both earned a 20 per cent bonus, then the bonus would be calculated and paid at the rate of 9½d. and 1s. an hour respectively.

It Seemed Unfair

The management decided to adopt this procedure because they felt that employees should be rewarded for extra effort in proportion to other factors such as the skill required for the job, length of service, and good timekeeping, which were already recognized by the variations in wage rates.

Unfortunately they omitted to take into account the fact that from the employees' point of view it would appear that the scheme was operating unfairly, because two employees doing the same job, and turning out exactly the same amount of work would receive a different amount of bonus if one was being paid a higher wage rate than the other. After the scheme had been in operation for a few weeks, the management were faced with a storm of protest from employees in the lower wage groups who wanted to know why, when they were working just as hard as their neighbours, they were earning less bonus.

The reasons were carefully explained to the employees concerned, but it soon became clear that the explanations were not being fully accepted, and that the supposed 'variations' in bonus earnings were causing the employees in the lower wage



The result of introducing one scheme was little short of chaotic. When the operators tried to achieve the targets, the material supply system broke down and output was seriously affected. Other weaknesses in the management structure, previously hidden by the general inefficiency of the organization, were mercilessly exposed



Often the main flaw in a scheme is that, to the employees, the link between work done and payment made is so tenuous as to be virtually non-existent. Unless the rewards for additional effort are forthcoming quickly, the full force of the incentive is lost

groups to lose interest in the scheme. Eventually the management decided to introduce a standard hourly bonus rate, so that employees earning the same percentage bonus would receive identical cash amounts in proportion to the hours worked.

While this change removed the main cause of discontent, the confidence that the employees originally had in the scheme was never fully restored.

Cause and Effect

Often the main flaw in a scheme is that, to the employees, the link between work done and payment made is so tenuous as to be virtually non-existent. If, when the employee works hard to earn more money, the reward is not quickly forthcoming, the full force of the incentive is lost.

In an investigation made to find out why a scheme introduced into a small group of factories was not operating effectively, it was discovered that owing to a complicated method of bonus calculation, and the fact that all figures had to be dealt with at head office, bonus payments were made a fortnight in arrears.

This position had been carefully explained to the employees before the scheme was put into operation. But even where this explanation had been fully understood (and enquiries revealed that many employees were still very vague about how the scheme worked) the apparent anomaly of a

high bonus being paid in a week when output was low, and vice versa, had caused much confusion.

By streamlining the procedure so that all employees were informed daily of their bonus earnings, and received the total bonus payment for the week in their current wage packets, enthusiasm for the scheme was soon re-generated.

When an employee is paid simply on time rates, he is aware that whatever work he does is in 'the firm's time'. While most employees 'give a fair day's work for a fair day's pay', they do not as a rule over-exert themselves to achieve record production figures.

Causes of Resentment

But with the introduction of an incentive scheme the employee's attitude towards his work undergoes a fundamental change. Now, a sizeable proportion of his earnings depend entirely on his own efforts, and consequently he is more likely to adopt a critical attitude towards matters in which he had previously evinced little, if any, interest.

For one thing, he will be quick to resent anything which prevents him from earning bonus. A hold-up in supplies or a temporary transfer to non-bonus work, are often causes of resentment or frustration. It is when such incidents are allowed to occur too frequently that incentive schemes which start off with every

appearance of success end up as dismal failures.

Difficulties of this kind caused an unfortunate situation to arise in a factory where, for many years, relations between the management and employees had been particularly good. As a recent re-organization had resulted in a substantial increase in productivity, it was felt that the employees should be given an opportunity to increase their earnings.

Not Worthwhile

At first the scheme appeared to be operating successfully, but it soon became apparent that the relations between management and employees were deteriorating. Minor difficulties, which had previously been overcome by the joint efforts of the employees and staff, were now the frequent subject of heated arguments; labour turnover figures began to rise. Although there was a further slight increase in productivity, the cost—in frayed tempers, irritating disputes and a general lowering of morale—was so great that the management reluctantly decided that the incentive scheme would have to be withdrawn.

The management of this factory now regard incentive schemes with a jaundiced eye. But the failure could have been avoided if they had realized at the beginning that to the employee an incentive is an intensely personal thing, bringing with it a fundamental change in outlook. *END*



With the introduction of an incentive scheme the employee's attitude towards his work undergoes a fundamental change. He is more likely to adopt a critical attitude towards matters in which he had previously evinced little, if any, interest



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JUNE, 1957



When an Employee Takes 'Trade Secrets' To a Rival Firm

The Law generally frowns on 'restraints of trade' which affect personal freedom, so it is difficult for firms to enforce contracts designed to stop employees from taking jobs with competitive firms. But there are circumstances in which the employer is entitled to protection in this respect.

THE High Court recently ruled that a contract, designed to prevent an employee taking up an appointment with a rival firm, could not be enforced.

For the first firm it was alleged that the employee, having got to know most of their secrets, left their service and secured work with another manufacturer in competition with them. Thereby, it was contended, he had broken a contract under which he had agreed not to take up employment with a rival firm within two years of leaving the first firm.

For the employee it was argued that the agreement was void because it was contrary to public policy.

Mr. Justice Gorman accepted this view and said that the public was interested in seeing that persons were allowed to carry on their trade, and any interference with individual liberty in that respect was contrary to public policy. "Employers", he added, "have to show that any restraints they impose are reasonable for the protection of their business."

Superficially, therefore, the law on this subject is comparatively simple. The Courts will uphold an agreement of this type in "restraint of trade", as it is called, if it is "reasonable". They will not enforce it if it is not reasonable from the point of view of the

public interest or from the point of view of the parties concerned.

Everything depends on what is meant by "reasonable". Generally, when the law on this subject was in process of formation, the tendency was to regard all restraints of trade, whether general or partial, as tending to create monopolies and, therefore, void. It was considered to be in the

By a Legal Correspondent

public interest to allow an employee to leave the service of an employer either to start up on his own, or to go over to another employer and speed up their production or modernize their methods. Competition of this nature was regarded as operating to the public good.

Nevertheless, in comparatively modern times, the Courts have recognized that there are circumstances in which an employer is entitled to protection.

The case of Nordenfelt v. Maxim Nordenfelt Guns and Ammunition Co., heard towards the end of the last century, indicates in a very neat manner what the Courts have considered "reasonable" and "unreasonable". Nordenfelt was a manufacturer of quick-firing guns and ammu-

nition. He sold his business and entered into an agreement restraining his activities for 25 years.

The agreement was, in effect, in two parts. The first was that he would not engage for 25 years either directly or indirectly in the trade of guns, gun mountings or carriages, gunpowder, explosives or ammunition. The second was that he would not engage in *any business* competing or liable to compete with the company.

As the company were engaged in the world-wide distribution of their products, the restraint on Nordenfelt's activities, too, was world-wide. The first part of the restraint, restraining Nordenfelt from trading in guns and ammunition, was held to be reasonable and therefore enforceable. On the other hand, restraining him from engaging in *any form of competition* with the company, was held to be unreasonable.

It can be taken for granted that if an agreement is directed only to the prevention of competition, or against the use of the personal skill and knowledge acquired by the employee, then the agreement is not enforceable.

On the other hand, an employer is entitled to have his trade secrets protected, and that protection may be secured by restraining the employee from divulging the secrets to another party, or putting them to his own use.

An employer is also entitled not to have his customers enticed away from him by an employee who has joined another firm or has started his own business. Thus, when a manager entered into an agreement that he would not engage, either directly or indirectly in a similar business for a period of 12 months from the date of the termination of his employment with his first employer, within a radius of one mile from the place where he was employed, this was held by the Court of Appeal to be a valid agreement, as the manager's employment brought him into contact with the firm's customers, and because of his influence with them, they might transfer their trade to his new employment.

Another example of a case in
Continued on page 122



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MANAGEMENT AT WORK

Colour Works

WE hear a lot about the value of colour in industry, but all too rarely are claims supported by convincing case-history material. Recently, however, the American magazine *Commerce* gave two instances:

1—Shortly after the last war, Jones and Laughlin Steel Corp., Pennsylvania, had colour experts in to brighten things up. Cheerful yellows, greens, wine reds and other hues were applied to machines, structural columns, pipes, walls and floors. Three years later, this was the situation:

▶ Lost-time accidents down by 38 per cent.

▶ Absenteeism reduced from 5 to 2 per cent.

▶ Labour turnover down from 4 to 0.4 per cent.

▶ Productivity up 10 per cent.

Not all these gains can be credited to what the company call their 'colour dynamics' programme. But the management feel it has contributed an 'appreciable portion' to their achievements.

2—Zenith Radio Corp. have now been using colour scientifically in their factories for about eight years. During this time they have averaged only one serious accident per year, and have recorded a considerable reduction in minor injuries.

The company state that painting overhead pipes, loading-dock edges and other hazardous spots in bright colours has more than anything else helped reduce the number of falls and head injuries.

The Customer Counts

DO employees really know enough about the end-product they are manufacturing? Do they see it in terms of sales? Does it mean anything to them personally?

Mars Ltd., Slough, think not. In recent months they have been dis-

playing a series of posters throughout the factory which drive home the theme: "When it makes a difference to our customers, it makes a difference to *YOU*." Quality and customer satisfaction are strongly linked with employment security by means of slogans, symbols and crisp presentation.

But Mars go further. To ensure that the posters have maximum impact, a competition was organized in the house magazine. Eight of the posters were reproduced, and employees were asked to write to the Editor, explaining in not more than 150 words which one they thought most effective, and why.

Off the Mark

THE application of small computers to routine office work is at last getting under way. This month's opening article describes how a British company prepared for the installation of the first production model of the Hec 4 general-purpose computer. Almost simultaneously, the first National-Elliott 405 electronic data-processing system to leave National-Elliott premises has been put into operation by the Norwich City Council.

The Norwich machine is being used initially for the preparation of rate demand notes and the maintenance of ratepayers' personal accounts. Details of 30,000 properties have been stored on reels of magnetic film—the 405's unique auxiliary 'memory' system. Each reel records details of about 9,000 properties.

For the preparation of rate demand notes, the rate in the pound to be levied is punched into a short length of paper tape, which is then fed to the computer. As each reel of magnetic film is placed in the computer, the rate due is calculated, and a record, in the form of punched paper tape, is produced containing all details required for the printing of rate demand notes by electric typewriters. Mean-

while, the amount due from each ratepayer is stored on the magnetic film, and a separate operation is carried out to produce a tabulation to form a rate book.

During the financial year, the magnetic films will be processed weekly to record details of cash paid by ratepayers, and of amendments necessitated, for example, by changes of occupier and sales of property by owners.

When the machine is used to capacity on this and other jobs, the council anticipate that it will produce staff savings of the order of 20 per cent.

Cheaper Deliveries

WALLACE King Ltd., Norwich house furnishers, have evolved an electric delivery vehicle to overcome petrol difficulties, and are finding that it pays them handsome dividends.

The van's aluminium body and fibreglass roof (for easier loading) were built on a standard chassis in the company's own workshops. Capacity is 400 cubic feet, to hold 30 cwt. Speed averages 25 m.p.h.

The motor is powered by two heavy-duty 36 volt batteries whose combined cost was £400. These are charged overnight by a simple plug-in attachment, at a cheaper electricity tariff. Delivery range is between 40 and 45 miles per day.

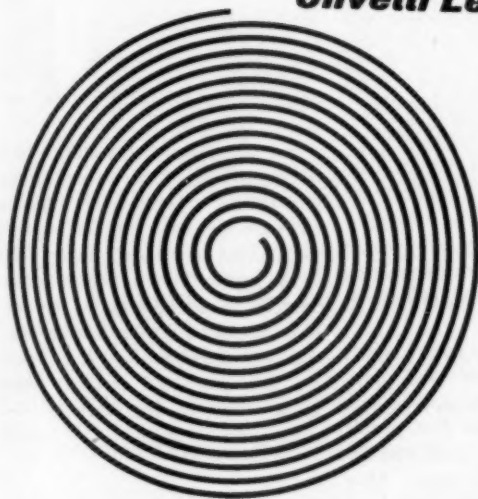
Precise working costs are not yet



Here is Norwich City Council's electronic data-processing system being installed recently. The computer is going to work initially on rate demand notes, subsequently taking over other procedures such as costing and payroll (see: *Off the Mark*).



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available. But estimates show that 40 miles a day will cost only 18s. a week. By comparison, the vehicle it is replacing used to cost between 25s. and 26s. per day.

A Record

NO fewer than 303 employees of J. Pullar and Sons Ltd., Perth dyers and cleaners, have completed 50 years' service with the company, since their first long-service award was made in 1888. At a recent ceremony, to mark the passing of the 300 mark, 75 of the 83 surviving veterans were present.

Managing director R. E. Marshall praised the quality of Perth's labour force which had made this achievement possible. And as a token of the company's genuine appreciation of this fact, he handed over a cheque for 300 guineas to an old folks' home in the city.

Free Look-See—1

THE Gas Council recently held an experimental 'Short Works Course' for boys from public schools. Originally a group of 12 had been considered, but so many applications were received that eventually 33 boys were chosen.

The course lasted a week, and tried to give the young visitors a balanced view of the gas industry. An active itinerary took them all over the Southern Counties. The group saw far more than just gas manufacturing processes. Visits to the Royal Festival Hall and to a number of London factories showed the many different uses to which the end-product is put. Time was also spent at the research laboratories at Fulham. Between visits, lectures, film shows and discussions took place.

No attempt was made to sign up recruits on the spot. But the gas industry is looking ahead for its management recruits, and, like many private concerns, is considering making these vacation courses a regular event.

Free Look-See—2

AT about the same time, 140 university students—both men and



They are 'open week' guests of a heavy engineering firm, finding out what an industrial career may hold for them (see: Free Look-See-2).

women—were guests at an 'open week' organized by Metropolitan-Vickers Electrical Co. Ltd., Manchester. They had been interviewed earlier in the year by the company's touring recruiting team, and could now see for themselves the training and career opportunities offered by the firm.

Good staff relations point: guides on visits to departments and shops were senior graduate apprentices. Obviously they are the best people to give prospective trainees the detailed information they want. After each day's programme, students were taken by coach to the apprentices' club, for tea with the members.

In the Public Interest

AS a contribution to the Ministry of Transport's 'Mind that Child' drive, Shell-Mex and B.P. Ltd., are using 500 of their poster sites throughout the country to display a tasteful poster on safety for children. Double-crown versions of the same material are being distributed to road safety officers for use in smaller displays.

This sort of promotion is quite genuinely 'in the public interest'—but it is also healthy for the prestige of the company doing it. It represents an unusual combination of public relations and advertising by a big firm.

Incidentally, this is not the first

child safety promotion by Shell-Mex. Others include: a jig-saw puzzle which was distributed to half a million school children through local education authorities, a road safety booklet that accompanies renewed driving licences, and humorous cartoon films.

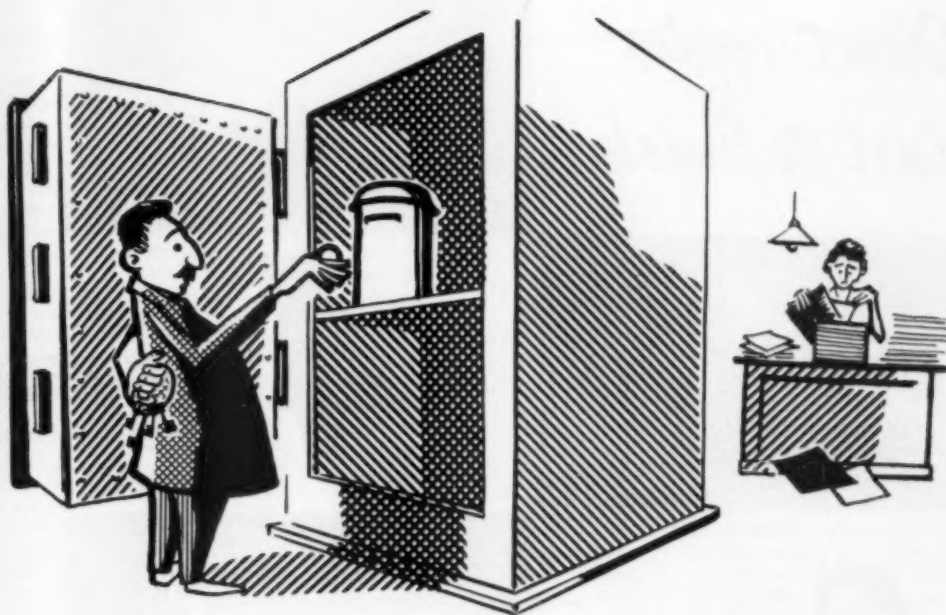
What They Really Think

GETTING the lowdown on employee thinking is not always easy. But the Garrett Corp., Los Angeles, have found a good answer. They conduct an annual opinion poll among employees, asking such questions as: How are the physical working conditions in your department? Do you like the way your supervisor handles his job? Do you like the company's personnel plans and policies?

But the questionnaire alone would not get results. Even an anonymous one causes mistrust and suspicion among employees. So Garrett send their forms to each employee at his home, and ask him to fill it in anonymously, returning it *not to the company* but to an outside firm of consultants. Members of the company are thus protected and can really speak their minds, knowing that management will see only a summary of results.



This is part of a road safety poster which is also an astute piece of public relations by an oil company (see: 'In the Public Interest').



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There are better ways than this to save money. One of them is to investigate the cost of paper work in your business. Two possible sources of saving are— (1) elimination of needless repetitive copying of information—(2) reduction of time spent by typists and clerks in preparing multi-copy forms of a routine character.

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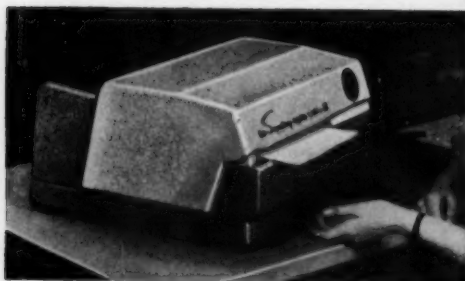
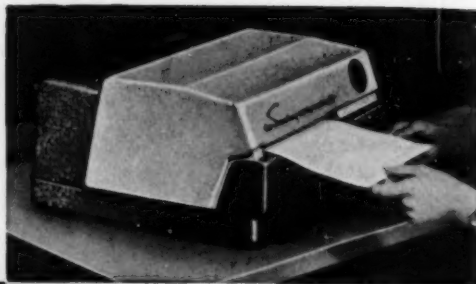
A great time saver in the typing department is "Parabar" Continuous Stationery. The Parabar attachment is easily fitted to any typewriter. Carbons, ready interleaved in the first set of forms, move to the next set on withdrawal of the completed forms from the typewriter. Typing output fairly jumps.

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Business Bookshelf

MANAGEMENT NOTEBOOK, edited by Arthur Roberts (Newman Neame) 35s. With a patent binding which enables every page to lie flat, this book is designed specially for students of the Intermediate Certificate in Management Studies. Each of the nine subjects of the course has an introductory section, followed by pages of printed notes down the left-hand half of each page, the right-hand half being left blank so that the student may add his own notes. At the end of each section is a bibliography for further reading. This notebook has advantages over any one textbook in that it puts the reader in touch with all the main textbooks on each subject and helps him in building up a private set of notes which will increase his speed of learning, and also form a permanent record of his studies. The editor of the notebook is the former reader in industrial administration, University of Manchester, and each chapter is written by an expert on the subject.

COMPANY EXECUTIVE DEVELOPMENT SCHEMES (Management Publications) 10s. 6d. The results of a survey made in the North-West of England by the British Institute of Management and the Manchester College of Technology. There are some dry statistics which prove, as usual, that some firms do and some firms don't train their managers. Of greater value are the 13 case studies which follow, describing in detail the training schemes of 13 companies operating in the North-West. They have been well chosen to cover different types and sizes of firm. The list is: Joseph Lucas; Marks and Spencer; Lloyds Bank; Ferranti; Royal Insurance group; Tootal Broadhurst Lee Co.; Baker Perkins; Thomas Hedley; Fibreglass; Switchgear & Cowans; Peter Spence & Sons; Lankro Chemicals; and Frederick Smith & Co. (Wire manufacturers).

THE MANAGEMENT APPROACH TO ELECTRONIC DIGITAL COMPUTERS by J. Sandford Smith (Macdonald & Evans) 35s. For the lay executive this book explains very simply the main units of a computer and how they work, the meaning of the jargon used, what "programming" involves, the effects of introducing a computer into a firm, the size of firm which can employ one, and the work it can do. The author is a chartered

accountant, a former senior business executive, and now a management consultant.

PRODUCTION FORECASTING, PLANNING AND CONTROL by E. H. Macniece (Chapman & Hall) 66s. The revised second edition of an American text by an author who has worked in industry and taught in universities.

COMPANY INCOME AND FINANCE 1949-53 (The National Institute of Economic and Social Research, London) 10s. A summary of the accounts of 3,000 public companies quoted on United Kingdom stock exchanges, with an analysis of the sources and uses of their capital funds. One of the conclusions of the analysis is that the larger companies have been growing more rapidly, both in profits and assets, than the smaller companies, and that the larger ones have not been able to finance their expansion out of retained profits. The smaller ones have, on the whole, been investing some of their profits not needed for expansion in the share issues of the larger and more rapidly expanding companies.

INTEREST AND DIVIDENDS UPON SECURITIES QUOTED ON THE STOCK EXCHANGE, LONDON, 1956. One of the conclusions from the latest edition of this annual publication is that the total of dividends and interest on quoted securities, which is paid out to persons in the form of disposable income, is no more than £625 million a year, which is only 3½ per cent of total personal income in the United Kingdom.

BRITISH STANDARDS YEARBOOK 1957 (British Standards Institution) 15s. Completely lists and summarizes all British standards up to the end of 1956.

THE MANUFACTURERS MANUAL (Littlebury & Co., The Worcester Press, Worcester) 30s. The official register of the National Union of Manufacturers.

BOTTIN INTERNATIONAL BUSINESS REGISTER 1957 (Didot-Bottin, 1 Rue Sebastien Bottin, Paris VII). 96s. With explanatory text in French, English, Spanish and German, this 2,200-word directory has product and geographic sections, covering the whole world. It gives general trade

information as well as the names and addresses of importers and exporters.

EUROPE TODAY AND IN 1960, and THE SUPPLY OF CAPITAL FUNDS FOR INDUSTRIAL DEVELOPMENT IN EUROPE AND THE UNITED STATES (Reports published by the European Productivity Agency of the Organization for European Economic Co-operation)

Are Your Costs and Prices Realistic?

Does your thinking take account of changing values? So many things have gone up in price—labour, machinery, supplies, professional services and finished goods. This table, based on the retail price index, gives you a rough set of conversion factors for bringing your values up-to-date. For example, if you spent £100 on a machine in 1931, for which year the conversion factor is 2.77, then you could hardly be surprised if a similar machine now costs £277. It may actually cost more or less, but you would expect values generally to be around 2.8 times the 1931 level. This table will be brought up-to-date every quarter, but published monthly, for handy reference.

Year	Conversion Factor	Year	Conversion Factor
1913	= 4.07	1934	= 2.89
1919	= 1.87	1935	= 2.83
1920	= 1.64	1936	= 2.77
1921	= 1.81	1937	= 2.63
1922	= 2.22	1938	= 2.60
1923	= 2.32	1946	= 1.69
1924	= 2.32	1947	= 1.60
1925	= 2.32	1948	= 1.49
1926	= 2.37	1949	= 1.45
1927	= 2.43	1950	= 1.41
1928	= 2.45	1951	= 1.26
1929	= 2.48	1952	= 1.18
1930	= 2.58	1953	= 1.14
1931	= 2.77	1954	= 1.12
1932	= 2.83	1955	= 1.07
1933	= 2.89	1956	= 1.02

This Electronic Conveyer

- *Gives Flexible Mass-production*
- *Eases Supervision Problems*
- *Cuts Operators' Waiting Time*

THE advantages of flowline production in the garment trade are not unknown. But the problem in an industry where manual skill plays the major role is to ensure that operators' differing work speeds are married into a smooth production process.

The corset and 'bra' section of the industry is less prone than most to sudden and wide variations of the end-product, dictated by changing fashion. Yet the more complicated, glamorous or expensive 'foundations' frequently have to be produced in small batches.

To smooth out problems of work distribution, supervision and variations between operators in this type of batch production, a 70-year-old family firm, Corsets Silhouette Ltd., have introduced an electronically-controlled conveyer to move garments along a series of making-up operations. It carries work baskets virtually automatically from machinist to machinist in the right order, and this order, moreover, can easily and quickly be varied.

Unlike 'one track' mass-production, it retains work until a machinist is ready for it. Therefore the track

speed is not tied to the rate of the slowest workers, and the operators grouped around it can work almost continuously on a wide variety of garment styles in a single shift.

It must be stated at the outset that all operators on the conveyer are capable of performing any of a wide variety of operations; also that the firm's production is concentrated in a new factory near Shrewsbury,

By DAVID LEE

which was built specially for flexibility of layout.

The conveyer, first of its kind in use in Britain, was designed by its West German manufacturers for this kind of production. At Silhouette's new factory it is being used, in effect, as a versatile and semi-automatic channel for work distribution. Last November it replaced a batch production layout in which the sewing machines were grouped around the supervisors' table, to which operators would bring finished work and take away a fresh box.

Under the old system the boxes

could wait idly on the supervisors' table for as much as a half-hour between operations. A recent study by the management of the work flow on one regular product before and after the introduction of the conveyer, showed a saving of about 150 yards of operator movement per batch. An average of 12 hours basket waiting time has also been done away with. Some waiting still occurs, of course, but normally the conveyer requires hardly any supervision and impending bottlenecks can be seen at a glance.

The conveyer, 84ft. long in the shape of a narrow loop, makes one revolution in 3½ minutes. Around it are grouped 40 operators at five basic types of machines, an easily variable arrangement. For each operator or station the belt has two numbered sections 42ft. apart; thus one of these passes the operator every 1½ minutes.

Work baskets are placed on the sections, which slope outwards, and held by electrically-operated catches. On the stationary 'plinth' of the conveyer, conveniently accessible to each girl's machine, are places for two baskets, one for work in progress, the other in reserve.

The baskets hold open electric contacts. When a girl lifts a basket to put it on the conveyer to be carried to the next stage of work, the contact closes. As the girl's section of the belt reaches her again the contact operates the catch and a fresh basket slides down to her. This happens at every station round the conveyer. If however, a machinist has two baskets in place, the waiting basket stays on the conveyer until she is ready for more.

Batch production is planned weekly and broken down into day-by-day schedules. The cutting room on the factory's 'open floor' is separated from the machinists only by a glass-topped screen. Shelves on the machinists' side hold supplies of cut materials and trimmings one day in advance of work to be done, though the cutting room itself has stores of cut pieces one week in advance.

At the beginning of the day the supervisors begin loading cut materials in baskets of a dozen each or the



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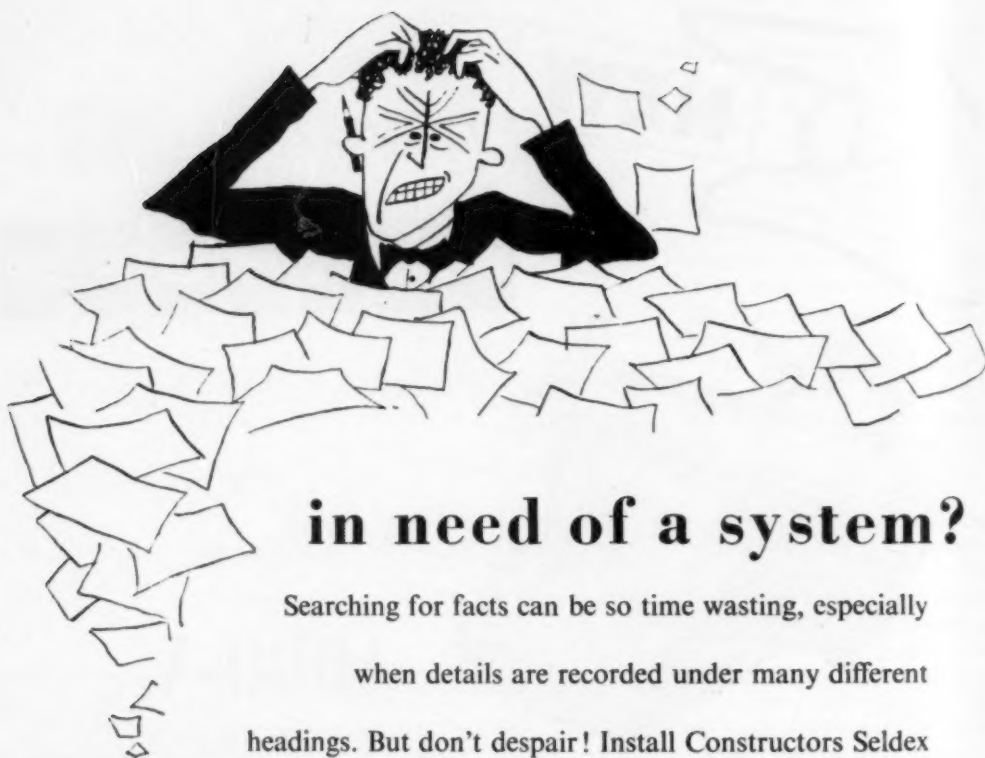
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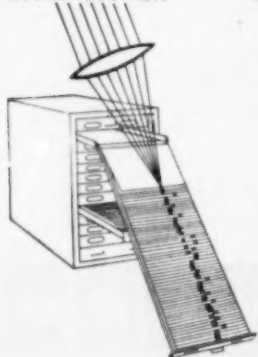
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conveyor for delivery to stations undertaking the first stage of making-up. Each basket has a printed sorting card giving its production route, by the numbers of the stations on the conveyor, and work instructions.

The supervisor also arranges any changes of operators occasioned by absence and so on. The general layout of machines, which copes successfully with all types of garments, has been established by experience and has not been changed for several months. Half-finished batches from the previous day, if any, are dealt with as soon as the conveyor starts.

Where the making-up process has a series of one girl/one operation stages, the conveyor takes the basket direct from one stage to another. Where, however, a machinist on a relatively short operation is feeding several girls on a more complicated task, or where a group feeds a group, the baskets are routed via the supervisor. An illuminated control board at the end of the conveyor has two red lights for the basket placed at each girl's station. These are lit when a basket is lifted and the contact is made.

The existing layout is also marked under the lights. At a glance the supervisor can see which girls need more work, and can load fresh baskets accordingly. Although the human element enters into the conveyor's use—for the girls have to be sure to put a finished basket on to the right section—most of them have become expert enough to gauge the time for the proper section to reach them and can thus get on with work from their reserve baskets in the intervals.

When things are running normally, it is claimed, the conveyor almost does the supervisor's job for her. It is only when hold-ups occur that she has to show her mettle. Even so, the fact that once a basket is loaded on to the belt it delivers itself, relieves her of the need for a good deal of worry and watchfulness. She has fewer baskets to keep under her eye.

If a hold-up occurs at one stage the supervisor can clear it quickly by temporarily bringing in another machinist from outside the conveyor

A series of lights shows the supervisor whether any of the 40 operators need more work, and she can load fresh baskets accordingly



circle; alternatively, the work or part of it can be farmed out to a machinist in another section of the factory. If a girl goes absent suddenly, the second course is usually adopted, as workers are 'fussy' about others using their machines. If, however, a bottleneck recurs continuously for non-mechanical reasons, it is an indication that the production rate of a girl or section is out of balance. This is rectified by reducing the over-producing section by one machine or by adding one to the section which is going too slowly. If a girl is taken off, she is easily absorbed into production elsewhere in the factory.

Urgent Orders

The flexibility of the layout eases the transition from one garment type to another. It also enables the insertion, into a normal day's production, of urgent orders required for quick delivery. A list of these is given each morning to the supervisor in consultation with the cutting room, and she tries to get them through fairly early. A minimum batch is generally reckoned to be about 16 dozen, but the 'urgent list' items can be produced at as low a rate as two or three dozen a day. Normally the aim is to keep runs long, but the importance of urgent orders to the sales side, and the fact that the more expensive garments sell at five guineas or more retail, makes small batches more economic than might be supposed, since the upset of production flow is minimized by the conveyor system.

A typical day's batch production includes about a dozen different

styles. Silhouette say, however, that 30 or more models can be produced in a single shift, the limiting factor being the relation of batch sizes and complexity to the number of machines.

So successful has the conveyor system proved, that Silhouette plan to introduce more conveyers for the 'progressive bundles' layout on which their biggest single line (a low-priced 'popular' corset) is produced. On one of the two lines making this product, trainees gain the later part of their experience. The added flexibility of the conveyor system is expected to be of value in balancing the output of trainees and fully skilled girls working side by side.

During its first eight months of operation, the new system has produced the following benefits:

- 1—An increase in productivity of about 15 per cent. (This has been matched by wages, as the piece-work system has remained unchanged.)
- 2—The reduction of supervisors from six to two on corset batch production. This compares with eight supervisors for 60 girls on the 'popular' corset. (In a non-industrial area where 'green' labour has to be trained from scratch, the reduction of supervision is a big advantage. The present works manageress, for example, was a machinist 3½ years ago.)
- 3—A notable saving in handling time.
- 4—Sufficient flexibility of the production process to free the operator's working speed completely from the 'track'.
- 5—The psychological incentive to

operators of always having work beside them.

The firm's average weekly output is now more than double the average 18 months ago. It is split roughly three ways between 'batch corsets,' the popular 'Little X', and the batch production of a variety of brassieres.

That 15 per cent productivity increase, it should be borne in mind, was achieved in a factory already designed for maximum flexibility of layout and for other aids to productivity.

The new works have replaced a series of stop-gap premises in Shrewsbury. Under the one roof are now combined the bulk of Silhouette's production moved to Shrewsbury in wartime, and what little was then left in London.

About three years ago a number of factors forced a 'drastic reappraisal' of the firm's production methods. These were mainly the great changes in the design and manufacturing techniques of the industry, developed since the war, and a rapidly expanded demand.

So while the company were still in the old works, the production of every regular item was reduced to its basic essentials by work study, and re-timed.

This took about 18 months' hard work under R. E. Harrison, the production manager, who had just joined the firm. Time rates were agreed with the workpeople on a basis that should enable the average trained worker to earn at least 20 per cent over the national minimum of 2s. 6½d. an hour. (In fact, earnings of 4s. and even 5s. an hour are not uncommon.) The time costing of each operation was also based on an operator working a productive hour of 40 to 50 minutes, according to the skill required, this being established by careful study.

Pilot techniques for the new works were tried out in the old. Soon after the move, "synchro-line" production of the "Little X" (i.e. stage by stage production of a garment as it passed down a line of operators) was abandoned as too rigid in favour of the "progressive bundles" system. For this change the factory's production



For each operator, the belt has two numbered stations. One of these passes the operator every 1½ minutes and automatically supplies her with work when she requires it

area (193ft. by 116ft., with only three roof columns and plenty of electric points) was already prepared. The one-floor layout also provides for the direct flow of material from the unloading bay through stock rooms, checking department, cutting room and machinists room to packing and despatch.

Piecework

The firm's 200 machinists (out of a total of about 350 employees) are all on the same piecework system. Collective bonuses operate for many of the others; in the cutting room, for example, they have raised earnings by about 35 per cent in a year. Between November, 1955 and November last year, production rose by nearly 120 per cent for the addition of 25 per cent in machinery and 33 per cent in staff. The working week has been reduced from 42½ hours to 40 without loss of production.

Job cards, prepared from the master book of work study analyses, go out with each batch of work to the machinists. These are marked in

cut-off strips for each separate operation, and each strip carries the serial number of the model, its size, quantity in terms of garments, and the serial order of operation. As each stage is completed, the operator cuts out her strip and, after adding her clock number, sticks it in a personal book, which is handed in and renewed daily. From this her wage payments are recorded every day.

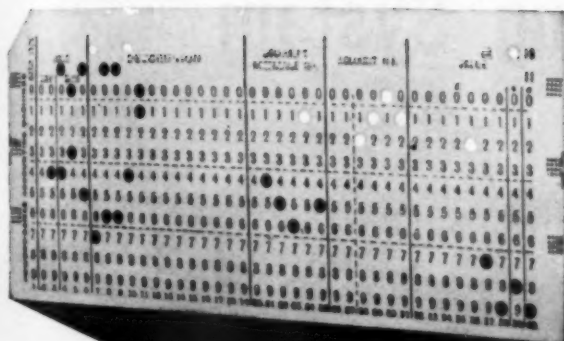
Four of six wider strips at the end of the card are torn off as the order reaches certain stages and are placed in wall racks in the production office to serve as an up-to-date progress record. These, like the remaining two for office use, are also marked with the colour of the garment in question.

Individual operators' strips are also used for the analysis of personal performance and, in general, for the costing of production. Any uncosted time (i.e. time over and above that allowed) is noted on the back of the card with the supervisor's signature attesting the reason. Analysis of this "lost" time enables the firm to ascertain exactly the cost of factors ranging from meetings, modifications and new work to the slowness of trainees.

Generally about two days are needed for a qualified girl, starting an operation new to her, to reach full dexterity. During this period she is compensated for loss of earnings by a payment rate of 25 per cent higher than normal.

For learners, there are three small once-for-all bonuses as each girl hits certain targets for the first time.

The firm have in mind two more measures to add even greater flexibility to the organization of production. These are, first, the formation of a corps of at least 36 highly dexterous machinists who can be switched at a moment's notice from their normal work to any part of the making-up room, so as to speed any lagging section, cope with sudden unforeseen production requirements and thus provide a further guarantee against bottlenecks. They are to be paid at a special "versatility" rate. The second is, when possible, to have a small pool of machines for the same purpose.



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Whether you sell goods or services, run a business or control the finances of a local authority, the preparation of invoices, bills, demands (call them what you will) involves costly clerical effort.

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New Invoicing System Cuts Errors and Delays

By LAURA TATHAM

Expanding production and fluctuating seasonal demand created a serious invoicing problem for a small manufacturing company. Using two types of standard office equipment, they have evolved a system which is fast, simple, accurate and economical.

A rapidly-expanding company is often like an adolescent boy who grows too big for his clothes. Its systems don't fit. At the beginning they may, perhaps, be let out here and there to accommodate new growth. But sooner or later they burst at the seams. The only solution to the problem is a fresh start with a different pattern.

This was the situation that confronted L. G. Harris and Co. Ltd., manufacturers of paint brushes, rollers and other accessories. The company started in a modest way producing a few items which they sold in small quantities. During the past few years they have expanded fast. The range of lines manufactured has now reached 200; orders have greatly increased in number, and have become larger and more complicated.

Two years ago the invoicing department seemed likely to be overwhelmed by the torrent of orders which descended on it. In spite of

many hours of frantic overtime, the backlog piled up.

Time was an important factor. There is a strongly-marked seasonal demand for Harris's products. As spring approaches, people feel an irresistible urge to brighten up their paintwork. The demand for brushes, rollers and scrapers rises sharply and must be met quickly. A week's delay in the invoicing department could lead to cancelled orders.

It was obvious that the new system had to be fast. For maximum efficiency it had to be flexible and, of course, accurate. Because skilled labour in the area was scarce, it had

to be simple. And it was desirable to keep the cost as low as possible.

The system chosen by the departmental manager, H. L. Wyneken, meets all these specifications. In Spring, 1957, with the seasonal demand at an all-time high and almost double the average of orders coming in, it was still working smoothly.

In the busy season the department processes up to 500 invoices a day. It is staffed by eight junior girls and a supervisor, and is equipped with hand-operated addressing and embossing machines, dye-line reproduction equipment, and a small

HOW IT WORKS . . .

Equipment consists of hand-operated embossing and addressing machines, dye-line reproduction equipment, and a small adding/listing machine.

Two 'masters' form the basis of the system—a metal plate containing the customer's name and address and coded with all relevant information on his account; and a translucent form, suitably ruled, and overprinted with the company's name and address.

Invoicing is done in the following stages—

- 1—Customer's name, address and code number are printed on the translucency with an addressing machine;
- 2—All details of order, including extensions, are inserted on a second addressing machine, using plates from file;
- 3—Particulars on the translucency are checked with the original order, and order number added;
- 4—Total is printed in on adding/listing machine;
- 5—Statement, advice note, copies of invoices are produced from the finished translucency on the photo-copying machine;
- 6—Translucency goes to accounts department as a basis for ledgerless accounting and a permanent record of the transaction.

Right off the beaten track



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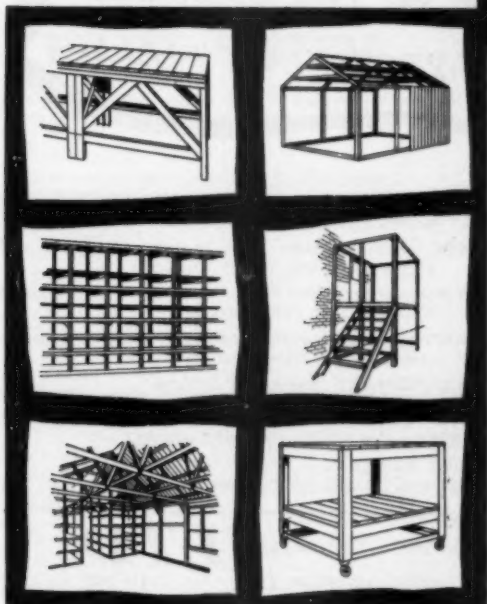


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surface. Coded symbols embossed on the plate indicate such things as discount rate, special instructions about extra invoices, or separate addresses for statements.

When an order is received, the customer's plate is pulled from the file or, if he has not ordered before, a new plate is made for him. This is done by a girl using a hand operated machine which embosses the parti-

culars on a lightweight zinc plate. As marks on the plate can be erased, mistakes may be corrected or changes of address easily made.

After collecting the address plates which correspond with the day's orders, the clerk puts these in batches into the hopper of the addressing machine. From there they are automatically fed, one by one, as she needs them.

Master document of the system, from which all copies are made, is a translucent form. This is headed with the company's name and address and, at the top edge, the word "Statement". The rest of the form is ruled in such a way that it can be used as both invoice and statement. First item to be printed is the customer's name and address and the date. At the same time, labels are addressed and a print from the address plate is stamped on the back of the original order in case of subsequent query. At the end of the day a complete list of the day's addresses is run off on the machine (to serve as

Continued on page 105



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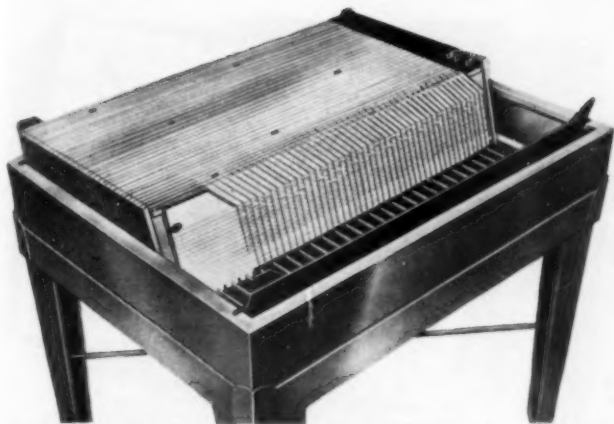
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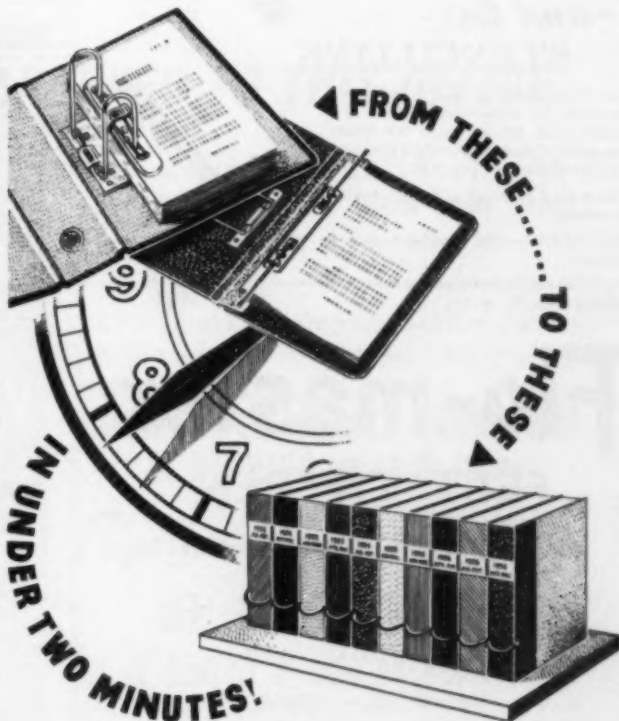
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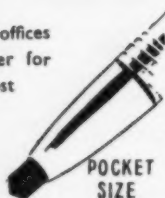
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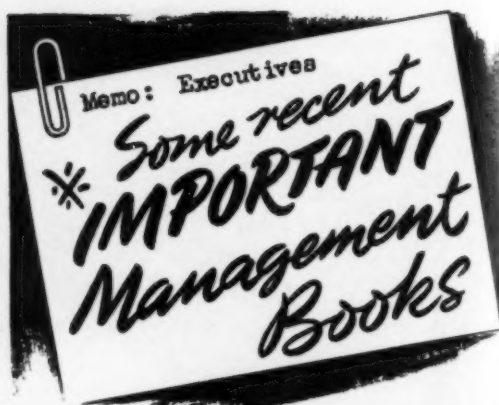
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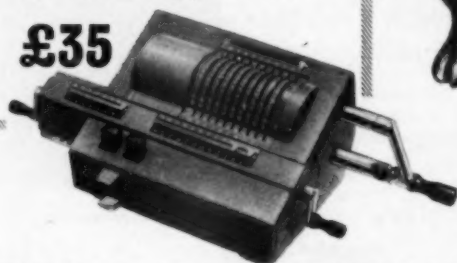
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SOMETHING'S HAPPENED TO THIS OFFICE



Papers everywhere... Staff working all hours... How can they run a business like this? . . .

GLADYS cannot be expected to know that the manager—at the end of his patience—has gone to the

**BUSINESS EFFICIENCY EXHIBITION
at OLYMPIA to look into**

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*but-points don't break
when you use*

EAGLE "CHEMI * SEALED"
MIRADO
pencils

It's sound sense to use Mirado pencils for all business and personal writing. The points won't crumble or break under normal usage. For two reasons. The lead itself is of a fine, smooth and long-lasting quality, and the Eagle Patent Super-bonding process welds the lead and the wood casing into one inseparable unit, giving maximum resistance to breaks. Change to Mirado - watch your pencil costs decrease.

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Our Mileage Meter measures how much line a Mirado lead will make. On the revolving drum, the pencil makes a continuous and easily measured line. The wear of Mirado leads has been tested until every pencil will make a smooth black line over 35 miles long.



EAGLE PENCIL CO., ASHLEY RD., TOTTENHAM, N.17

M6

By appointment



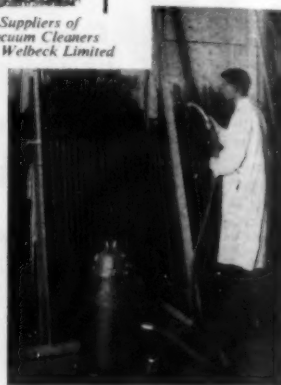
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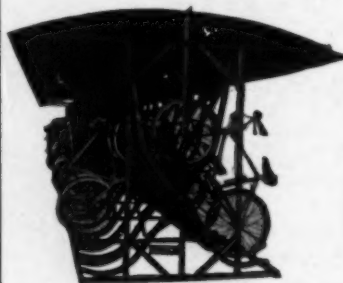
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Filestore Bookcase units are the latest items—made on a sectional unit principle, these units offer wide scope for a variety of uses in addition to normal filing. On a floor area of 4 sq. ft. up to 150 ins. of easily accessible files may be housed.

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THEY ARE HYGIENIC AND DISPOSABLE AFTER USE!!

Supplied in rolls for **AUTOMATIC CONTROLLED DELIVERY CABINET**

These **BETTER** quality towels **REALLY DRY** and do not disintegrate when wet. They are **CHEAPEST IN THE LONG RUN** because released **ONE AT A PULL** from the cabinet there is **NO WASTE**.

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Cut your Laundry Bills—Cut time-waste—Offer a fresh cream shade towel for every occasion—Remove infection dangers of the old communal towel—Are stronger wet than dry—Conform to 1937 Factory Act. No possibility of chapped hands and faces. No irritating queues as with expensive Hot Air Drying Equipment.

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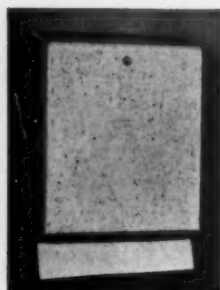
Tel.: HOwARD 1847 (5 lines).

Grams: Sylkacrepe, Enfield

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*Cuts your
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New steam-heated HAND & FACE DRYER

OUTSTANDING ADVANTAGES:

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Photo by courtesy of The
Universal Grinding Wheel
Company Ltd., Stafford



FURTHER PARTICULARS FROM THE AIR TOWEL DIVISION (Dept. B)

THE SPIRAL TUBE & COMPONENTS CO. LTD., OSMANTON PARK ROAD, DERBY.

Tel: DERBY 48761 (3 lines)

LONDON WORKS: HONEYPOT LANE, STANMORE, MIDDLESEX. TEL: EDGWARE 4658/9

NEW INVOICING SYSTEM

Continued from page 98

a post list) and the plates are then ready to return to the file.

Translucent invoice and order then go to one of the operators responsible for filling in details of the order. Two of these girls, each with her own addressing machine and rack of plates, print the commodities from the orders, item by item, on the translucency.

Each plate bears quantities, description, price and value of one of the 200-odd lines produced by the company. A typical plate would, for example, list three dozen items at a fixed price but at six different discount rates, with the net value and discount code in each case. By reading the code letter already printed on the invoice, the clerk knows which rate is applicable. Use of the machine's selective head enables her to print only the selected line.

Most of the goods are ordered in standard quantities. But where odd amounts are required, the operator uses a plate showing type of com-

In the hands of a good operator the dyeline photocopying equipment produces 300-400 prints an hour



modity and price only. Other details are typed in later.

The next stage is to check the invoice details with the original order. When these are correct, a clerk inserts the order number. Then she lists the extensions on a small adding-listing machine and, by sliding the lower edge of the invoice into the machine opposite the printing mechanism, records the total at the foot of the form.

The final stage of the invoicing process is making the customer's copy, the representative's copy and the packing note. All these are produced from the same original translucency by a dye-line photocopying machine. This ensures complete consistency between documents. A dry-process machine is used, which means no time is wasted in waiting for copies to dry. Microfilming of translucent masters has replaced the need for an office file copy.

Different sizes of sensitized paper are used with the master in order to include only such details as are relevant to each document. On statements, for instance, full-sized paper is used; for invoices, a slightly shorter piece which cuts out the word "Statement" printed on the top of the translucency; and for packing notes, a narrow paper which cuts out price and value.

A valuable by-product of Harris's invoicing system is ledgerless accounting. Translucencies go to senior accounts clerks for filing. Accounts are filed by month, and are withdrawn as soon as payment is made. In this way the clerk can immediately ascertain, by reference to the file, what accounts are outstanding in any one month. Paid accounts are filed in customer order, together with any correspondence. A complete record is then available of transactions with any particular customer. The only book to be kept is a control ledger, in which is entered bulk

SOME ADVANTAGES OF THE SYSTEM . . .

- ▶ **Accuracy.** No copying errors. Once an address plate is made and checked, it remains a permanent, correct record. All documents are photo-copied from original address plate entries on a single translucent form.
- ▶ **Simplicity.** None of the machinery requires skilled labour. Young girls are trained in a few hours, become proficient in days.
- ▶ **Versatility.** Each girl learns every job. Extra loads can therefore be distributed evenly throughout the department, and bottlenecks eliminated by re-deployment of labour.
- ▶ **Speed.** Orders are fully documented and passed to despatch department the day they are received.
- ▶ **Low Cost.** Machinery is not elaborate; stationery wastage is nil.
- ▶ **Easy Accounting.** Accurate, durable, easily filed translucencies have made ledgerless accounting possible.

figures for each day's transactions, broken down into alphabetical blocks and subdivided by months.

"At first the auditors weren't too keen on the idea," says Mr. Wyneken. "They kept on coming in rather nervously and making spot checks. But I think we have convinced them now that it is entirely satisfactory." The ability to make spot checks at any time without warning is a great help to the auditors.

As accounts are paid, the translucent master is extracted from the ledger tray, stamped 'paid', and filed by customer. The trays only contain 'unpaid' transluents, so it is an easy matter to print and send out statements or 'overdue' letters. There is also the certainty that an account cannot be overlooked.

Two important safeguards in ledgerless accounting are subdivision of the control ledger, as mentioned earlier, and regular balancing. Balancing is done by listing unpaid transluents on an adding-listing machine. All sections are balanced weekly, though not necessarily on

the same day. The few errors that do occur are quickly located. Because of the elimination of copying the ledger clerks have more time for watching accounts and dealing with queries.

Every year the contents of the customers' files are microfilmed. This saves space and at the same time ensures that past records are readily accessible if required.

Labour Conditions

Local labour conditions took a part in evolving the present system. Harris's works are at Stoke Prior, a country district 20 miles outside Birmingham. There is an adequate supply of labour, but it consists mainly of young, unskilled girls.

"In the past we have had difficulty in getting suitable recruits for our invoicing department," says Mr. Wyneken. "But now we find that a girl fresh out of school begins to be useful to us within a week. By the time a few months have passed she is a fast operator. Good workers

can produce about 60 six- or seven-line invoices an hour. A beginner can do about 30 or 40 per hour after very little practice.

No skill is needed to operate the photocopying machines, though the girls improve with practice. The best operator can produce 300/400 copies per hour. With two operators on a machine, output has reached over 2,800 copies in four hours.

Flexibility has been achieved because of the simplicity of the machines. Every girl is trained for every job in the department, so that if one is absent her work can be spread through the department. Everyone has to work a little harder, of course, but the absences cause no serious disruption.

The girls enjoy this arrangement. It adds to the interest of the job if they know the whole process, and a changeover from one task to another avoids monotony. Bottlenecks are quickly eliminated, as if one operation falls behind, the girls work in shifts over the lunch hour until things have levelled out.



large, light and handsome

For the new Vactric Washing Machine, now in full-scale production, National Plastics make the tub, the agitator, the inner lid and two control knobs. The tub makes news, for it is the first of its kind in Great Britain, chosen because it saves space, conserves heat, needs no maintenance and is light in weight into the bargain.

National Plastics, in collaboration with Vactric Ltd., are responsible once again for a real pioneering effort.



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makers of plastics mouldings and extrusions on a very large scale.

NATIONAL PLASTICS (SALES) LTD., Avenue Works, Walthamstow Avenue, London, E.4. Larkwood 2323

Mr. Wyneken admits that a long period of experimentation with different methods preceded the introduction of the present system. "We have had to improvise as we went along," he says. "In the early days we managed quite well employing invoice typists using accounting machines with continuous stationery. The girls worked out extensions and discounts by mental arithmetic as they went along."

As the company expanded, and orders became more complex, this system was found inadequate. After various minor adjustments had proved unsatisfactory, the company tried out a punched card system. This, in its turn, was not the answer. Complexity of orders and discount rates required the use of several bulky pre-punched files. Despatch requirements made all cards expendable as the stock analysis had to show individual invoice numbers and details. Shortage of trained staff resulted in pulling errors, which were not easily located. Arrears began to mount steadily, in spite of many hours of overtime.

What about Costs?

Will the present system continue to work if expansion continues? Says Mr. Wyneken: "If work increases substantially, we can get extra addressing machines and photocopying equipment and, of course, extra staff."

What about costs? The answer to that question is simple. In spite of the greatly increased output, the department's labour costs have remained static. The machinery cost about £1,400; plus a further £1,100 for 58,000-odd plates and storage equipment. Maintenance costs are minimal. As far as stationery is concerned, the present system is no more expensive than any other method.

Perhaps the biggest material gain of all is in accuracy. By reducing copying to a minimum, the possibility of mistakes is correspondingly reduced. Previously there was a fairly steady stream of complaints about incorrect addresses or invoice particulars. Such errors are now extremely rare.

END

JUNE, 1957

the
first
cost is
the last
cost

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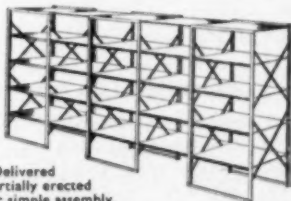
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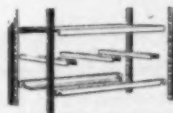


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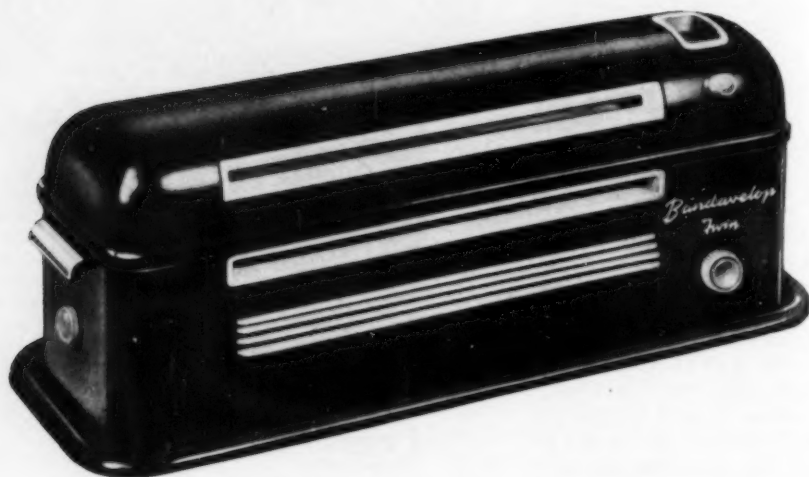
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BUSINESS Equipment Survey

NEW AIDS TO GREATER OUTPUT AND LOWER COSTS

FOR YOUR OFFICE

Electric Typewriter

SPECIAL features of the new Underwood electric typewriter include rapid electric ribbon re-wind, right- and left-hand carriage return keys, and keyboard-controlled electric margin setting.

The machine has air-cushioned carriage return which, though fast, is smooth and quiet. Rubber cush-



Fast—smooth—quiet

ioning in the inner works further reduces noise and wear. Keys are shaped to prevent broken nails and chipped varnish.

*Underwood Business Machines Ltd.,
4-12 New Oxford Street, London
W.C.1*

Useful Folder

A NEW folder, combining engagement book, scribbling pad and stand-up calendar, would make a useful gift, the makers suggest. Measuring 12in. by 8in., the folder's outside cover and calendar frame provide enough space to include the donor's name and address and/or an advertising slogan.

Two kinds of engagement pad are available—with either seven or three days to a page—and alternative bindings are leather, leather cloth or leatherette in any colour. Advert-



Memos ensemble

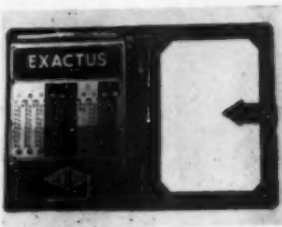
ising text may be blocked in gold, silver, or in a colour to contrast with the binding.

A de luxe version with refillable pads and bound in tooled or morocco leather can be produced to special order. Various adaptations of the contents may be made, such as a simplified version without the scribbling pad. Each folder is supplied with a carton designed to conform with printed paper postal regulations.

*E. S. and A. Robinson Ltd.,
Redcliffe Street, Bristol*

Pocket Adding Machine

ENCLOSED in a leather wallet, complete with notepad, the *Exactus Executive* sterling adding machine will slip easily into the pocket.



Tiny_tot

Small holes on the machine's face are moved up and down by a stylus which has a pencil at the other end. Addition and subtraction can be done to a total of one farthing short of £1m., and the machine is cleared by pulling a bar at the top.

The makers will engrave the donor's name at the top if the machine is used as a business gift.

*Exactus Business Machines, 2-3
Victoria Chambers, Luke Street,
London E.C.2*

Cool, Clean Air

LATEST addition to the *Westair* range of air-conditioners is the *One Point Five*, which cools, filters and dehumidifies the air in a single room of up to 3,200 cu. ft. The unit has a built-in thermostat to control



Eight-minute air change

air temperature, and distribution of treated air may be regulated by adjustable louvres which direct the stream and control the quantity of air circulated. A special "pump out" feature can completely clear and replace the air in the room within eight minutes.

Base tray, front cover and several internal parts are made of corrosion- and shock-proof reinforced resin. Steel parts are stove enamelled. The

★ Equipment included in this survey is selected for its news value alone. Manufacturers are invited to submit details of new and interesting products for consideration. An original photograph should accompany each item submitted.

BUSINESS Equipment Survey

silent fan motor is fully enclosed and the fibreglass filter can be serviced without removing any part of the unit.

The unit, which measures about 2ft. 6in. deep by 2ft. 4in. by 1ft. 3in., may be mounted in a window or in an aperture in an outside wall. An alternative model acts as a heat pump, providing heat equivalent to 2Kw. at the cost of 1Kw. of electricity.

Westool Ltd., St. Helen's Auckland, Co. Durham

Automatic Time Recorder

A NEW high-speed attendance recorder needs a minimum of manual operation. The worker merely puts his card into the *Blick Model 81 Electoprint* attendance recorder, and the machine does the rest. Successive registrations are automatically placed one below the other on the time card, and it is impossible to overprint.

The date is automatically changed at midnight and two-colour printing is also automatic—normal time in

blue, late- and over-time in red. Times of the colour switch may be set as required and changed at any time.

The recorder can work direct from A.C. mains or may be incorporated into a one-minute impulse master clock system.

Blick Time Recorders Ltd., 96-100 Aldersgate Street, London E.C.1

Adaptable Desks

THE tops of *Q-Line* desks are completely detachable from the pedestals, and the pedestals may be used separately as telephone or side



Flexible Assembly

tables. Each desk consists of two identical pedestals and a top supported on an underframe and crossbar for strength. Three screws on either side hold the top in position, and these may be removed in a few minutes.

Assembled with its pedestals facing in opposite directions, the *Q-Line* desk will accommodate two typists; a pair of desks placed at right angles makes a unit for four workers which may save space and speed the flow of work.

Available in oak, mahogany or walnut, the desks are variable in height and have a top size of 4ft. 6in. by 2ft. 6in. Each pedestal contains three shallow drawers with recessed finger-grips.

Carson Bros. (Productions) Ltd., 3-4 Charlotte Road, London E.C.2

Indexed Minutes

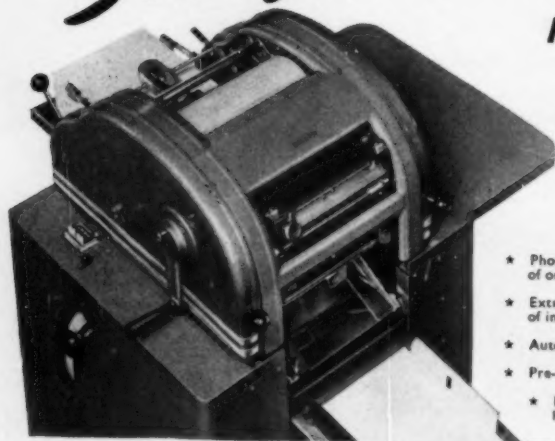
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A black and white photograph showing a variety of metal fasteners. At the top left is a large, dark-colored hook bolt. Below it and to the right are several smaller bolts of different sizes and shapes, some with hexagonal heads. There are also several circular washers and nuts scattered around. The fasteners are arranged on a dark, textured surface, possibly a workbench or a piece of machinery. The lighting is dramatic, with strong highlights and deep shadows, emphasizing the metallic textures and the different forms of the hardware.

COOMBS of WIMBLEDON

R. A. DOOMBS LTD., STANDARD WORKS, RICHMOND RD., WIMBLEDON, LONDON, S.W.20

BISLEY

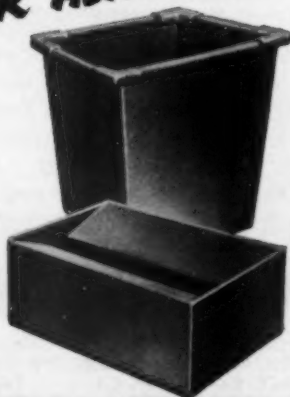
FIREPROOF

WASTE PAPER BINS

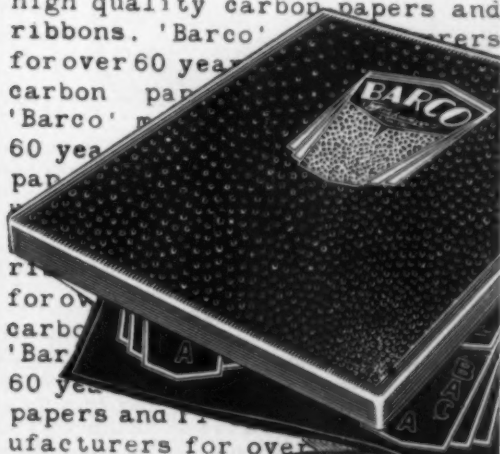
and FLOOR ASHTRAYS



**You don't
need a
match to
start a fire
—a cigarette
end or pipe
ash may
do it . . .**



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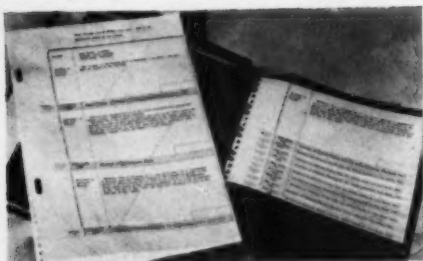
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BUSINESS Equipment Survey



For preparing simultaneously a minute book sheet and visible index

No. 526, which enables a typist simultaneously to prepare a minute book sheet and visible index. Loose-leaf minute sheets, printed on one side only, are made up into duplicate sets, the top copy of which is punched for a thong binder minute book. The duplicate, suitably punched, and also perforated horizontally, is torn after typing into separate sheets for insertion into the visible binder.

Both copies are divided into panels, one for each minute. At the foot of each panel is a shaded portion on which the subject of the minute is

typed. Longer minutes may be made up of two or more panels.

C. Cakebread, Ltd., Baches Street, London, N.1.

Circular Slide Rule

TEN inches in diameter, the *Wor-man-Denton* 10-cycle slide rule has a scale nearly 200in. long, arranged in ten concentric circles. The scale runs from the centre outwards, an arrangement which places the longest logarithmic divisions on the shortest circumference, and vice-versa, thus

making for easy reading of five significant figures.

Location of values is aided by reference to bold figures on the dial rim, the figures being radially in line with main division values.

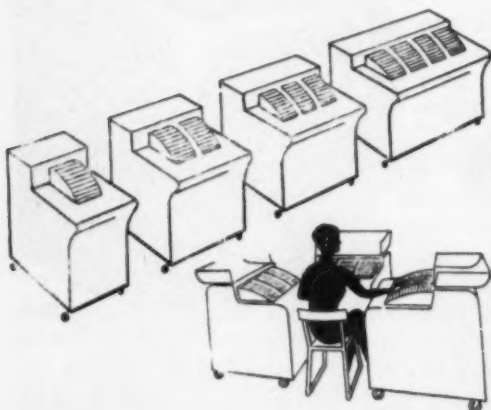
Montague Worman, 4 Mosley Street, Newcastle-on-Tyne

Miniature Stapler

THE owner of an overloaded brief-case might profitably find room for a miniature stapler which will keep related papers together. The *Bambi*, scarcely larger than a match-box, will take a strip of 100 tiny precision-made staples which will fasten up to six papers together, or will tack on softer surfaces.

One thousand refills are included with the *Bambi*, which is available in a Perspex container or in a P.V.C. wallet-style pack.

Ofrex Ltd., Ofrex House, Stephen Street, London W.1



ROLSON takes care of records

This mobile and space-saving record keeping system handles new or existing records of any size from 5" x 3" to 8" x 10".

Units are available with one, two, three or four wheels which retain cards without belts, springs or magnets, and from which records can be lifted out and returned without impediment. One operator can control more than 70,000 records. Why not investigate this simple, safe and accurate record system?



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Facts worth knowing about the SERVIS RECORDER SYSTEM

WHAT IS IT ?

The SERVIS RECORDER consists of a simple clock mechanism, enclosed in an aluminium case, which rotates a circular wax-coated paper chart calibrated in minutes and hours. Also inside the case is a small yet heavy pendulum fitted with a sapphire-pointed stylus which draws a continuous line on the chart as the chart is rotated by cutting through the wax. No ink is used and the line cannot be erased or altered.

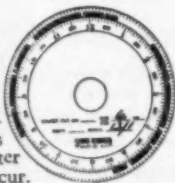


HOW DOES IT WORK ?

If the SERVIS RECORDER is stationary, the pendulum hangs down at rest and draws a smooth continuous thin line on the chart. If it is moved, the pendulum swings to and fro, drawing small transverse lines on the chart instead of a thin continuous line. In other models, the pendulum is moved electro-magnetically by means of a low-voltage circuit incorporating a micro-switch operated by a moving part of any machine.

WHAT DOES IT DO ?

From an examination of the chart it is possible to tell the precise periods when the machine or vehicle was running or stopped, by noting the times when the variations in the character of the line traced by the stylus occur.



WHERE IS IT FIXED ?

So long as the pendulum is substantially vertical in the rest position, the SERVIS RECORDER can be mounted in any convenient location; on or near production machinery—or in the driver's cab in the case of vehicles.

HOW IS IT USED ?

By providing a written record of a vehicle's movements (or of a machine's running time), the SERVIS RECORDER enables you to improve output, reduce overheads and cut out time-wasting by planning on facts, not guesses.

The simplest, most economical, reliable and durable method of getting the vital facts you must have for efficient management of plant and/or vehicles. Full details supplied with zest and alacrity by:

SERVIS RECORDERS LTD

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Telephone 24125

JULY 1957

SAVE 68% FLOOR SPACE

New Shannoblic LATERAL Filing Saves Time, Space and Money by GOING UPWARDS instead of OUTWARDS

'Skyscraper' isn't quite the word for a Lateral Filing Unit, but in both cases the principle is the same: build upwards not outwards—and valuable space will be saved.

Lateral Filing more than doubles the volume of folders you can get in any given space. Better still, odd corners and passages—previously wasted—become valuable filing assets.

But space-saving isn't the only advantage of the system. Far from it; time and labour too are saved—and efficiency is greatly enhanced.

With Shannoblic Lateral, access to files is *direct*. No drawers have to be handled. Each unit is like a library where you go straight to the volume you need without touching anything else.

This 'spot' identification is achieved by full-vision title-strips incorporated in each file. Used in conjunction with coloured signalling and charting devices, these title-strips give instant location of any file... plus heightened visual control over all business activities from Personnel Management to Job Costing.

Single rail suspension—an important new feature of Shannoblic Lateral—makes grouping and handling of files a simple matter: a slight tilting movement easily engages or disengages the file required.

Thus, Shannoblic Lateral forms both the master 'nerve centre' for the larger concern... and the ideal space-saver for the smaller one.

Ask for details of the system now. Every Executive should know about it. Just write 'Shannoblic Lateral' on your letterheading and post to:

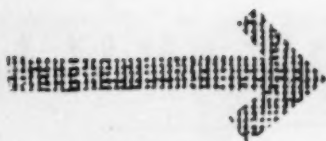
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The Shannon System

50 Shannon Corner - New Malden - Surrey

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We can help you to comply with the Factory Act 1937 by providing equipment for an inexpensive Fire Alarm system suitable for **your** factory. Note the following advantages :—

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Newcastle 1: Tangent House, Leazes Park Road.



BUSINESS Equipment Survey

INDUSTRIAL EQUIPMENT

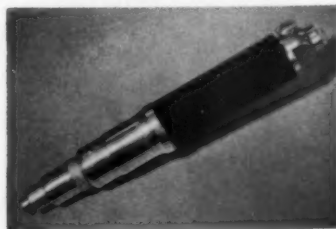
Silent Screwdrivers

LARGE numbers of a new range of pneumatic screwdrivers can be operated simultaneously without causing annoyance. This is because improvements in design have reduced the noise and increased efficiency.

Other advantages are an improved plastic grip which is unaffected by oil or moisture from the hands, and a deflector sleeve which exhausts the air downwards away from the operator.

The screwdrivers are available in four speeds, each designed for a specific purpose. The slow-speed models give higher torques.

Accessories include screwdriver bits for all types of screws with either



Gives four speeds

slotted or cruciform heads and a wide range of box spanners for nutrunning. Hexagon bits can be supplied for driving socket-headed cap screws.

The screwdrivers cost the same as the old models which they replace.

Desoutter Brothers Ltd., The Hyde, Hendon, London N.W.9

Electrolytic Polisher

FOR examination under a microscope metal specimens have to be ground flat and given a high surface finish; then the surface to be examined has then to be prepared in such a way that a true picture of the grain structure is revealed. This is so difficult to achieve than an electrolytic method has been developed.

Electrolytic polishing is excellent for single and multiphase alloys and for materials such as austenitic stain-

less steel where physical polishing can cause work hardening. With soft metals it is possible quickly to achieve results which even a skilled



Safer polishing

operator can seldom obtain by other methods, since there is a marked absence of surface deformation and consequently etching is uniform.

Nash and Thompson Ltd., Oakcroft Road, Chessington, Surrey

Flexible Cleaners

BATTERIES provide the power for the new *Mechocleen* range of floor cleaning equipment. It comprises three machines: a dry scrubber-polisher, a wet-dry scrubber-polisher, and a dryer.

The machines can be operated anywhere, independent of power points or the restrictions of trailing cables, which are sometimes a hazard. The two scrubbing machines can be adapted to clean any type of floor simply by changing brushes, which takes



No trailing cables

only one minute. Brushes available range from those with hard steel bristles, for scouring impacted grease deposits, to polishers with soft fibre bristles.

The dart-shaped nose of the scrubber unit enables corners to be cleaned. Because the brushes scrub and polish the full 19in. width of the machine, floor areas alongside walls and immovable machinery can also be scrubbed. Batteries are easily removed for charging.

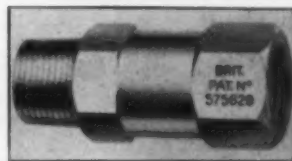
Diamond Motors (Wolverhampton) Ltd., Upper Villiers Street, Wolverhampton, Staffs.

For Kinkless Hose

KINKING in a hose is inconvenient and shortens its life. The *Anti-Kink* coupling joins hose to hose or (with suitable attachments), hose to valve, and gives unlimited free turning. Torsional strain is eliminated and the free swivelling of the coupling, even under extreme pressure, makes kinking impossible.

The coupling is guaranteed leak-proof under pressures up to 2,000lb. per sq. in. No lubrication, adjustment or attention is required.

The coupling has other uses: for



Lengthens hose life

example, connecting feed lines to rotating equipment, and in conjunction with pneumatics. It is available in sizes from 1/4in. to 3/4in.

Meynell and Sons Ltd., Montrose Street, Wolverhampton, Staffs.

Two-speed Drill

A new two-speed portable electric drill permits the use of correct cutting speeds for different metals. With a 1/2in. capacity, it performs 1/2in. (high-speed) and 1/4in. (low speed) drilling operations with the minimum of effort.

When drilling deep 1/2in. diameter holes in hard materials, fast, accurate penetration is obtained by drilling a 1/4in. diameter pilot hole before boring out to the required diameter.

For hardwood, the drilling capacities are higher, namely 1in. dia-

BUSINESS Equipment Survey



Simple speed change

meter on low-speed and $\frac{1}{2}$ in. diameter on high-speed. A simple push-pull switch changes speed when the drill is stationary.

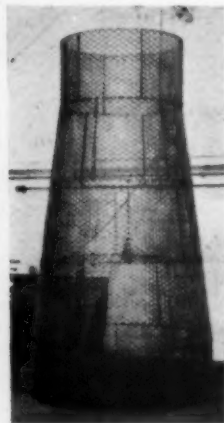
The drill is available with a $\frac{1}{2}$ in. capacity drill chuck or a No. 1 Morse Taper socket.

*Wolf Electric Tools Ltd.,
Pioneer Works, Hanger Lane,
London W.5*

Cement Reinforcement

CEMENT structures, when reinforced with *Hexmetal* (a fabrication of steel-walled honeycomb cells) become more resistant to temperature variation, abrasion, vibration, corrosion and impact.

Hexmetal is constructed with independent pin joints, which give flexibility without risk of fracture, even when rolled to very small dia-



More durable structures

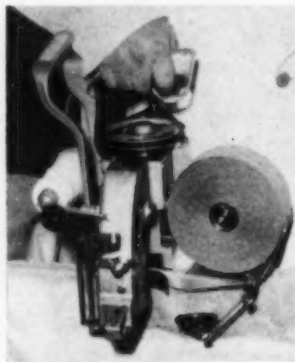
eters. The employment of independent pins also increases resistance to corrosion, since the pins, being unstressed, are less prone to corrosion than integral lugs. In addition, *Hexmetal* prevents lining failure from slide, bulging or surface pitting. Plants in which other rigid linings have collapsed can often be made good with it.

There is considerable saving in installation costs. Cement laid on a sloping surface is liable to slump, whereas when it is used with *Hexmetal*, it retains its position, saving time and labour. Furthermore, the thick layer of cement, usually necessary to provide strength, is reduced to little more than $\frac{1}{2}$ in.

*Causeway Reinforcement Ltd.,
66 Victoria Street,
London S.W.1*

Bag Sealer

QUICK, neat and easy-to-operate, the *Faseal* portable bag-sealing attachment fits a crepe strip over the top of a multiwall paper sack, ensur-



Better bag sealing

ing perfect closure. The strip also acts as a reinforcement against the weakening effect of stitching perforations made by ordinary machines. By incorporating a miniature guillotine and mirror the *Faseal* enables the crepe and stitching cotton to be severed simultaneously, while the operator has an unobstructed view of the entire sealing operation.

The unit is particularly useful in cases where multiwall paper sacks alternate with other types. When the run of paper sacks has ended, the

Faseal is put out of commission by throwing a spring-loaded hinge. No unscrewing or dismantling is required. It is claimed to be the only attachment which can be used on a portable bag closer.

*Thames Sack and Bag Co. Ltd.,
Furze Street, London E.3*

Capless Lamp

ROBUST and compact, a miniature capless lamp will interest manufacturers of electronic equipment, control panels and domestic appliances. It resists humidity, vi-



Small but robust

bration and high or low temperatures.

Instead of a metal cap, with cement and soldered connections, it has an accurately moulded glass base with lead wires symmetrically disposed on opposing faces. Contacts are formed close to the glass faces and terminate at the end remote from the seal outlet by a groove moulded across each face of the glass base. This offers scope for simpler socket design without sacrificing performance.

*A. E. I. Lamp and Lighting Co.
Ltd., Crown House, Aldwych,
London W.C.2*

Compact Pump

COMPLEMENTARY to the self-priming version, the *Alcon* $\frac{1}{2}$ -in. non-self-priming pump is for use in buildings where there is a closed water circuit. It also operates with flood suction where the water is above pump level. It is suitable for boiler circulation, laundry water circulation, car and lorry washing.

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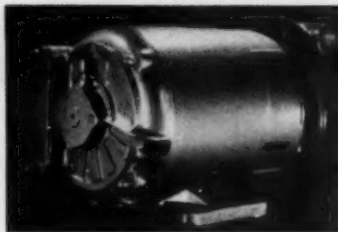
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BUSINESS Equipment Survey



Integral pump and motor

fountains, and ornamental gardens.

The outstanding feature is that the pump is actually part of the $\frac{1}{2}$ h.p. electric motor, enabling the pump to withstand external blows. This compactness is important for permanent installation in closed water systems.

The pump can be supplied with either $\frac{1}{2}$ in. or 1 in. B.S.P. fitting for inlet and outlet. The maximum suction lift after priming is approximately 8ft.

Arthur Lyon and Co. (Engineers)
Ltd., 6 Carlos Place, Grosvenor
Square, London W.1

Heater-Cooler

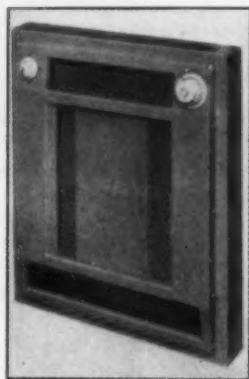
HEATING or cooling by blown air is provided by the *Newday*, which incorporates fan air diffusers and a pre-set time control. It is available in two forms, with identical internal equipment. One is a freestanding unit; the other is inset.

As a heater, the *Newday* has a 3kw. output which produces a rapid rise in

room temperature as the heat is dispersed by the fan. Then the unit can be switched to half-heat, (convection only) at 1500w.

The unit incorporates a pre-setting device with two dials, rotatable to give time control over a maximum of 18 hours. One dial enables pre-set commencement of heating during any period up to 14 hours; the other provides four subsequent hours during which the heat can be cut off.

Gillott Electro Appliances Ltd.,
Cotswold Works, Chalford,
nr. Stroud, Glos.



Pre-set controls

Protects Metals

PACKED in an aerosol container for easy application, *Ruby* is sprayed on metal surfaces to form a hard, corrosion-inhibiting coating, which is red in colour for easy examination and economy.

The film is strongly resistant to scuffing and abrasion, and will not crack in conditions of heat and moisture. Once applied, it will remain intact for a very considerable period. It can, however, be removed by readily available solvents, such as paraffin or white spirit. One tin

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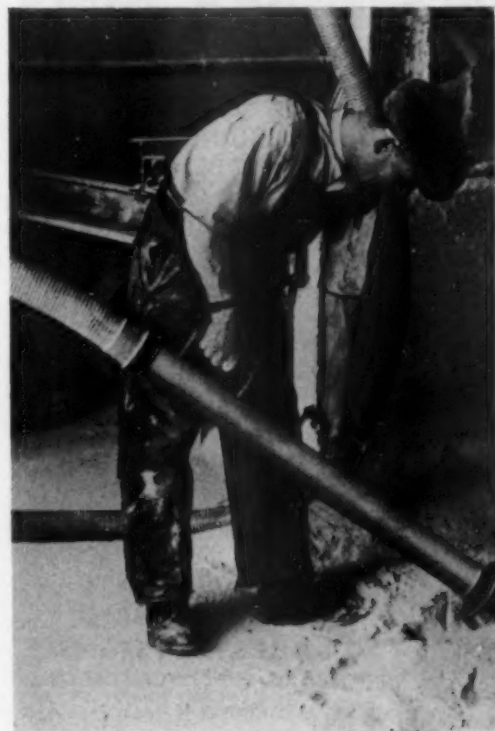


Ballroom at Nottingham University, Portland Building. (Architect: John Wright, F.R.I.B.A., A.A. Dipl., Hons.).

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The British Vacuum Cleaner & Engineering Co. Ltd.
(Dept. 1), Goblin Works, Leatherhead, Surrey.

BUSINESS Equipment Survey

covers a minimum of 150 sq. ft.

As a test, pieces of shim steel were degreased, sprayed with one coat of *Ruby*, and suspended by iron wires in various positions in the open, and under cover, and subject to acid fumes, dampness, and alkali fumes. The coating gave complete protection. It is particularly suitable for machine tool parts, spares and gauges.

Amber Oils Ltd., 11a Albemarle Street, London W.1

Flexible Terminal Strip

MOULDED in a tough p.v.c. composition, the *Kabi FLX5* terminal strip can be shaped to almost any contour or cut with a knife to give a useful range of connections between one-way and 12-way.

The terminal strip withstands very high voltages. Breakdown on test at the National Physical Laboratory was reached at 9,000v. Normal rating is 5 to 10 amp.

Precision Components (Barnet) Ltd., 13 Byng Road, Barnet, Herts.

CANTEEN AND WELFARE

Tea Dispenser

FRESH tea at the drop of a coin is provided by the *Tea Cub*. No pills or powders are used: the tea,



Tea any time

immediately after brewing, is deep-frozen in the cabinet. Throwaway paper cups, fresh milk and sugar (if desired) are all provided.

The machine is suitable for instal-

lation in factories, offices, or places like petrol stations, where refreshment is often wanted at awkward times. Water and electricity supplies are required, as heat for the tea is provided by a stainless steel tank of water, thermostatically maintained at a high temperature, inside the unit.

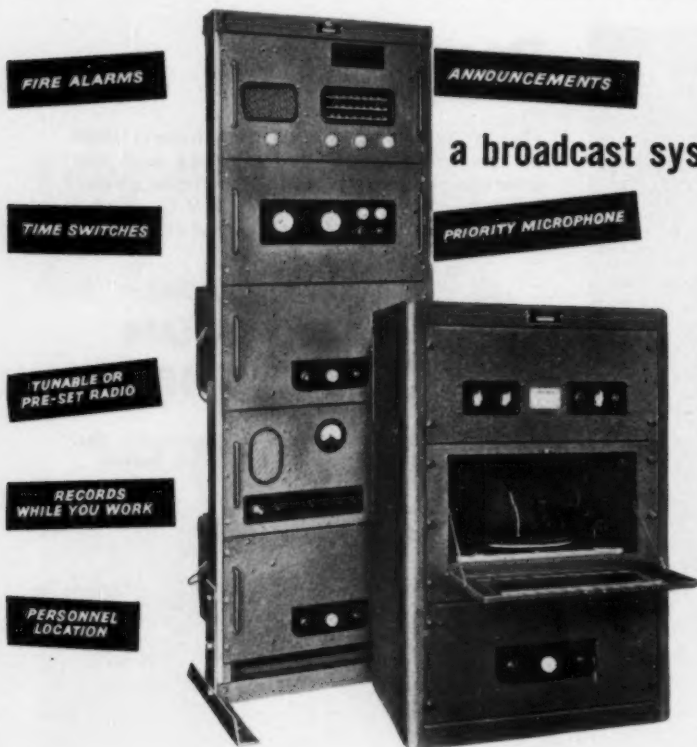
W. M. Still and Sons, 29 Greville Street, London E.C.1

Clean Frying

SILICONE treatment of the *Fry-Clean* pan prevents food sticking to the surface. Long-lasting, the silicone finish is cleaned with a damp rag or tissue paper. Steel wool and abrasives are not necessary (in any case they are liable to damage the surface).

Grease does not burn and there is no black carbon even after long use. In fact, the use of grease with meat is unnecessary. Food has a better taste.

Unida Products Ltd., 22 Uxbridge Road, London W.5



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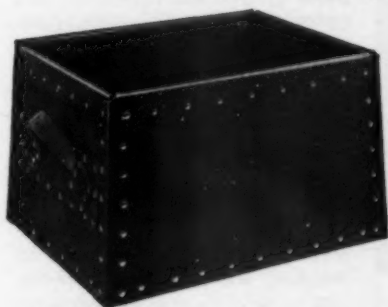
THE PHONOTAS CO. LTD., 125 HIGH HOLBORN, LONDON, W.C.1



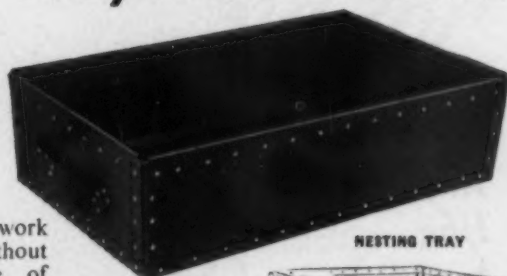
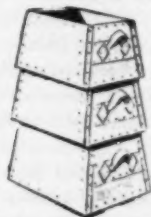
HOLborn 7221

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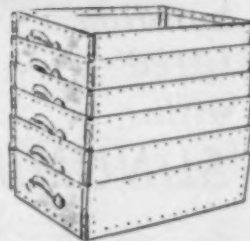
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NESTING TRAY



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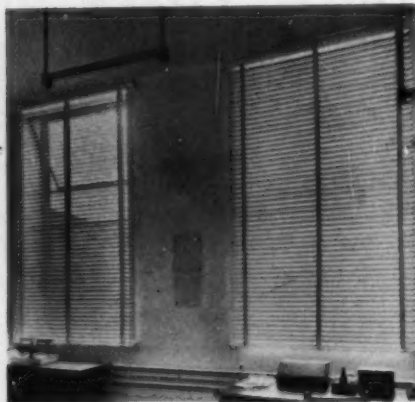
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J. AVERY & CO. (Est. 1834) LTD. 81 GT. PORTLAND ST., LONDON, W.1.
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TRADE SECRETS

Continued from page 82

which the Courts decided that a manufacturer was entitled to protection was that of a firm who were chiefly engaged in making glass and glass bottles. The works manager had been instructed in certain methods, confidential to the firm's employees, concerning the correct mixture of gas and air in the furnaces. He agreed that during the five years following his employment with the firm, he would not carry on glass bottle manufacture, or any other business connected with glass making in the United Kingdom. The Court decided that the five years was reasonable, and therefore the contract was valid.

It is important to remember that the responsibility of proving that the employee has acquired substantial knowledge of some secret process rests with the employer.

'Area of Restraint'

If the so-called secret is no more than a "method of organization", or if the employee knows only a small part of the secret process (such a small part that the information is useless because he cannot put the whole process into operation) then efforts at restraint will be unreasonable.

The area of restraint is very often a factor the Courts will take into consideration. In the Nordenfellt case, for instance, the restraint was world-wide, because the trade in guns and ammunition is world-wide. But an agreement whereby an agent, employed to canvass for orders in Islington, was prohibited from trading anywhere within a radius of 25 miles of London, was held to be void.

The time factor is also considered by the Court. An agreement covering "any future time"—that is a complete ban on the employee for the remainder of his life—has been held to be valid, because the employee had access to highly confidential documents. Generally speaking, however, long-term agreements are frowned upon by the Courts.

END

BUSINESS

STAFF SELECTION

Continued from page 61

selecting the wrong sales girl, training her and then having to sack her for incompetence after only a few weeks."

This is even more true in the case of personnel higher up the ladder. They usually take the complete battery of five tests, and their papers and scores are sent to America for analysis. This comes back in the form of a complete 'personality portrait'.

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The exact methods by which the analysis is done are, of course, his professional secret. But Premier state categorically that these reports are even more exact than the consultant claims. Where the management have previous knowledge of a candidate and disagree with the Eimicke assessment they sometimes act against his advice. But usually they regret this. Recently they promoted a man to branch manager whom the tests had rejected for that job. The result was an expensive failure, and the man had to be relieved of his position as soon as a successor could be found. In short, Premier's experience is that in almost every case, the Eimicke assessment is utterly reliable.

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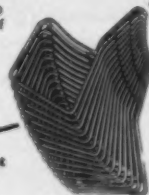
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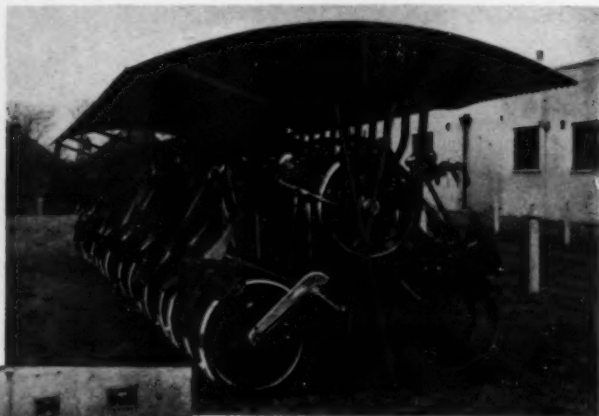
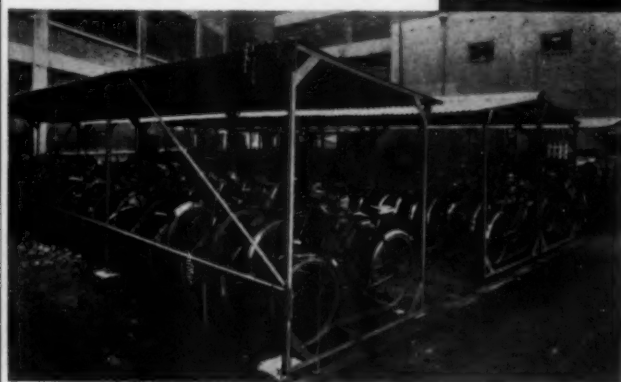
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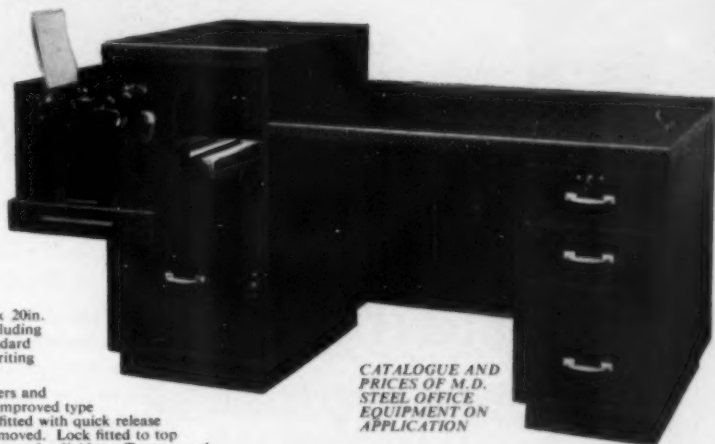
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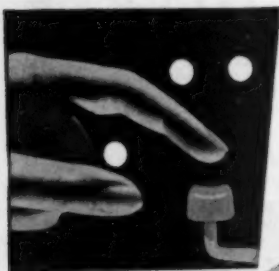
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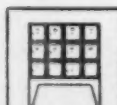
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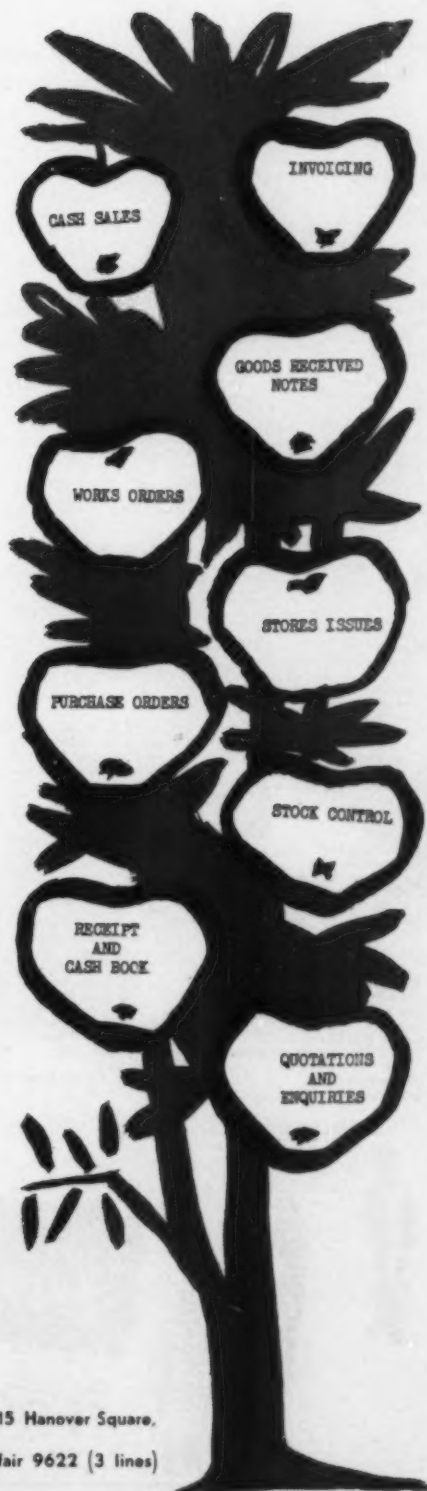
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